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BIO-POLITICS

M O R L E Y R O B E R T S

BIO-POLITICS

AN ESSAY IN THE PHYSIOLOGY
PATHOLOGY & POLITICS OF THE
SOCIAL & SOMATIC ORGANISM

L O N D O N : D E N T

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PREFACE

FEW advances made recently in sociology have been based on biology and I am not aware of a treatise on the subject by a biological student. Essays, to be suspect as mere racial propaganda, have been written by politicians in other countries. Here it almost seems as if sociologists had given up serious attempts to link social phenomena with the science of life in general. They have, therefore, followed Herbert Spencer in his later developments rather than in his essay entitled *The Social Organism*, which might have been used to lay the foundations of a real philosophy of history. It is lamentable that Spencer's fierce individualism and hatred of State intervention should have led him to smother his own offspring, legitimately descended from Hobbes. Yet, however greatly he feared a logical process which led to the conception of a social caste system, it is obvious that he regarded the resemblance noted between the animal and social organisms as much more than an analogy. He was, perhaps, not the first philosopher whom personal prejudices prevented from following a promising path of investigation. If, however, a guess may be made why he acted thus, it may be put down to the fact that he never was in any true sense a biologist.

Yet for all Spencer's retreat from the perilous frontiers of the promised land, the fact remains that his theory was viable and survived, though as something of a sociological outcast. Thus it is now always supposed that work on, or mere reference to, the social organism, must have originated with Spencer. Ready as I should be to acknowledge obligations to him, it is just to say that though the mechanics of the method used in this essay probably derive indirectly from Spencer, its main motive

power came from a source unknown to sociologists, the *Lectures on Pathology* by the late Dr Henry Gawen Sutton, once senior physician at the London Hospital, which I became acquainted with so long ago as 1889. If, however, I were asked to point to particular passages in Sutton's work I should have some difficulty in finding them. It was rather in his clear understanding that physiology and pathology were but two sides of a shield and his occasional suggestions that disease is often the outcome of society and 'its individual disorder,' which suddenly opened to me the great conception of a social pathology. This was an entirely new idea to me as anything more than a mere metaphor. But social pathology implied its correlative physiology and therefore a social organism which was a reality and no metaphor. Having thus conceived of social pathological states I made use of them in essays dealing with health and disease in the human body when working on biology seriously as a necessary preliminary to returning to social studies. When I did become acquainted with Spencer's essay, *The Social Organism*, and learnt later that his individualist prejudices had prevented the proper use of his own organon, I felt, in spite of this refusal, that nothing should block further trial of what may be called organic materialism. I therefore determined to work on the theory, having none of that peculiar dread of analogical reasoning which afflicts English workers. During many years given to pure physiological and pathological problems I found so much use for social analogies that I came to regard the results as definite proofs of the method's soundness and of the validity of the organic conception itself.

That I have felt obliged to keep the analysis on as purely material a plane as possible should not be distressing to psychological sociologists: who, indeed, do their best when they in their turn keep to the method with which they are best acquainted. I have thus avoided ethical and other discussion

which would merely confuse any argument properly confined to biological and physical phenomena. That this endeavour to keep to one plane in argument has difficulties cannot be denied. But those who have experienced a profound sense of confusion when studying work, otherwise worth attention, which is conducted, or misconducted, on several planes at once, should be grateful to those who seek intelligibility by avoiding appeals to irrelevant evidence. It is for this reason that I have avoided particular study of modern sociologists who have followed the historical or inverse deductive method. To hope to elucidate by indirect deduction, even with the approval of Comte and Mill, phenomena capable of explanation by a series of analogies amounting to direct induction, as Mill himself avers of analogy, seems to be grasping at a shadow and missing the substance.

It being obvious that this evolutionary method may be applied fruitfully to all social phenomena which can be dealt with as growth or decay, I do not propose to do more than give examples of its use. I have therefore said little on many important social structures, preferring to leave them to students who may be interested. Thus I do not pretend to say anything specially of economics or the commercial system, which indeed should come under the head of nutrition or the general distribution of social energy. Religion I leave gratefully to theologians, although I have been compelled to deal lightly with the structures and organs in which it functions. That I have avoided using the many illustrations of the general argument at hand in modern European and world conditions may seem surprising. But in a study which clearly calls for freedom from prejudice and passion, and indeed from any moral or psychological conceptions, it would be highly injudicious to introduce examples of recent evolutionary action which must inevitably excite emotion without promoting understanding. It will be noted that I have not touched

social reproduction in the text. Something on it will be found in the Appendix.

Many, perhaps, will think that the extent to which this organic method may be carried must render it nugatory. I am content if it seems no more than occasionally suggestive: but in order to bring more conviction than ordinary arguments appear to do when it is stated that evolution on semi-morbid, or socially disturbing, lines is always in progress, I have thought it necessary to introduce into the evolutionary argument a new conception. The theory of stress, breakdown, and repair, which is developed in the fourth chapter, throws a strong light on variations in social growth of all kinds and very little consideration will declare its universality in constructive evolution.

It is true that I have used it elsewhere in mammalian construction and variation generally and there is yet no sign that the orthodox biologists have turned their attention to a theory which seems to smack of Lamarck. But in the continuous phenomena of social organic growth there is no question of the discontinuity implied in successive generations, and objections to this source of variations based on an academic and accepted but doubtful view of heredity in the animal body cannot apply to social organisms. I have therefore used this particular tool of analysis with confidence, and in applying it to engineering, architecture, law, and social growths of all kinds, however varied, am convinced that there is disclosed in all of them a universal law of variation of the simplest kind which accounts for cumulative constructive functional variations on the purest epigenetic lines without appeal to orthogenesis, teleology, preformation, or purpose. I need hardly say that this strict adherence to the factors of an organic materialism need deter none from retaining confidence in any more general scheme of the universe to which they are accustomed.

As I cannot thank all the members of the medical profession who have helped me by discussion and criticism, I venture to name among them as eminent representatives of their great order Sir Arthur Keith, Sir Walter Langdon-Brown, and Professor G. W. Nicholson, who during the last twenty years have afforded me great, continuous, and necessary encouragement.

M. R.

LONDON, 1937.

CHAPTER I

THE SOCIAL ORGANISMS

PATHOLOGY AND DISEASE AS EXPERIMENTS. The first draft of this book was finished in 1912 and was no sooner seen as a whole than I felt too ignorant of biology to let it go. To biology I therefore applied myself. The great physician, Dr Henry Gawen Sutton, whose work on pathology first led me into the study of social organisms, had taught me, what few biologists have yet recognized, that some knowledge of pathology, the study of disease and disorder as a vast experimental field of variation, was essential to any one endeavouring to seek general principles. Years of work on these lines naturally led to the neglect of my prime object. I had sought help to explain sociological problems and had found that the conceptions clinging round the social organism did much to elucidate the life, growth, and death of the animals and man. The result of this was a series of studies published finally in *Warfare in the Human Body* (1918) and in *Malignancy and Evolution*, printed eight years later. The reception of these volumes by men of science, especially by those among the medical profession, was so far from discouraging that it would have tempted me to pursue the subject of malignancy had it not seemed to me that political thought had advanced, if only a little, since 1914. There might, it seemed, be some chance now for a study in social physiology and pathology if it were written with attention to practical affairs. It did not seem impossible that it would be of some use to politicians and even to statesmen. This looked the more likely when I observed

that the theory of a social organism, recognized academically for so long as little more than a pleasant fiction, had really made advances since the War. Certainly I found less ridicule directed at it by those who had to study Europe in the hands of such physicians as the times afforded, though one great difficulty remained in the contempt of any politician of experience for outside philosophers who are apt to proclaim that they have in their possession a key to all problems and a panacea for all ills, apparently including some cure for human nature itself. I confess that this book will not discover to the curious student any cure for biological earthquakes. Humbly following Spinoza I have merely sought to study the phenomena of disease, disasters, peace, and wars and revolutions with as much serenity of spirit and coolness of observation as these phenomena allow.

SPENCER AND THE SOCIAL ORGANISM. That sociologists as a body have rejected Spencer's theory of the social organism is scarcely surprising. He himself, alarmed at the conclusions to which it led, refused to work it out logically. The first requisite of any adventurer on the edge of the unknown is courage to combat his own prejudices. Spencer, with his increasing horror of the State as an all-devouring monster, was unable to do this. Thomas Huxley, also the victim of obscure scientific prepossessions, backed Spencer in his illogical form of individualism. When sociologists observed that Spencer denied his own offspring it was scarcely likely that they would seek to revive it. For one thing it is clear they mostly knew no biology or next to none in spite of their master's injunction to study it. Perhaps they had learnt that Spencer really knew none though he had taken immense pains to hear of it second-hand. There are few signs that modern sociologists have done as much. I find it difficult, indeed, to understand how sociology any more than psychology can be described as science proper. They are both bodies of un-

organized learning. And sociology refuses its proper station in biology. Thus with all its brilliant theorists it shows no sign of real life. If this is a hard saying it should be observed that with all the sociologists' lip-service to evolution they appear to look forward to a permanent state of society. If any have suggested a living organic state in an environment subject to secular, powerful, and catastrophic change, a state, like all organisms known or guessed at, liable to death, I have not found it. It seems that sociologists are more optimistic than biologists or palaeontologists. Spencer was sure that evil would disappear. He believed that absolute perfectibility would be the lot of humanity. Progress was 'a beneficent necessity.' He believed in perpetual peace. His astounding idealism was shared by Huxley, who regarded it as within human power, aided by ethics, to get the best of world or cosmic forces. Mill believed that 'practical instructions, founded on the highest branch of speculative sociology, will form the noblest and most beneficial portion of the Political Art.' His confidence in social advance, so largely founded on Comte, led him to speak of 'the Philosophy of the Progress of Society' as if he knew what progress was and that it would continue for ever. It seems as if something of this idealism still affected sociologists if they believe in a permanent social paradise in spite of the fierce biological drama of late years and all its prognostics. If I put Spencer's denegation of his own viable theory, which breathed life into Hobbes's monster, down to ineradicable individualistic prejudice, I have to ascribe the present denial of its value to ignorance of the very meaning of biology. There is no course of preparation worthy of the name for the budding student of sociology. It is impossible to read any modern sociologist without feeling that he does not know how his body works, how his organs and tissues and cells grow and live. But he is ready to write books which, after putting aside the theory

of a social organism, tell the live, complex, organic world how it works, what it should do, and what will be its fate. It is hardly necessary to say that I have studied few of these works and none with confidence.

SOCIAL 'NOUMENA' AND POLITICIANS. It is scarcely probable that saying so will have much effect, but perhaps students are afflicted with Spencer's fears. Yet is not their task to work out the problems involved, even if they seem to end in something which Spencer disliked? I own that the more these studies are pursued the more inevitable seem the processes involved. This is not to say that evolution is destined to come out on foreseen lines, at least not in any given time, which is what is of importance to the present generation and a few generations to follow. But if there is any scope for what we may call relative free-will it should be displayed by statesmen discerning social tendencies somewhat earlier than history ever displays them doing so, and making provision for the inevitable. For a politician engaged in the study of phenomena the workings of the social organism with its mass movements and instincts may be regarded as 'noumena,' those hidden 'causes' behind phenomena or the 'things that appear.' If to most this appears philosophic nonsense, some may have remarked that great actors on the political and revolutionary stage have experienced a deep sense of wonder as to the beginning and early growth of institutions. Robespierre spoke of politics as a mystery. 'To what does this mysterious scheme of politics and legislation amount?' And he answered in a way that certainly proved it a mystery. 'To put into effect the moral truths of the philosophers.' John Morley says in his sketch of Edmund Burke that at the bottom of all his thoughts about communities and governments there lay a certain mysticism. Thus he came to speak of a stupendous wisdom moulding the great mysterious incorporation of the human race. It seemed that when history and reason had

done their best the vital secret of organic national life must come from regions beyond reasoning and beyond history. Bacon in *The Advancement of Learning* said: 'Even unto the general rules and discourses of policy, there is due a reverent and reserved handling.' This view should fit perfectly with what I have said of social 'noumena.' It is from the social organism's mass movements that all energy comes to build and rebuild again and again all organs and institutions. Joseph de Maistre, in *The Generative Principles of Political Constitutions*, attributed their origin to occult forces and half-divine legislation. Burke, with all his peculiar passion for rhetoric, was so much moved by this conception that he actually desired to throw a political cloak over all mysterious social origins. He would undoubtedly have resented any attempt to investigate scientifically the sacred secrets and origins of social institutions, beliefs, and customs, as vain, futile, impertinent, and disturbing. Though thought has advanced far since Burke's time, any searching inquiry into the rights and origins of property might raise an equal storm of adjectives. For if Burke said of man 'through just prejudice his duty becomes part of his nature,' there is no such source of prejudice as property unless it be religion.

PUBLIC IMPORTANCE OF BIOLOGICAL STUDY. I have said so much on these points to show that, whatever may be thought of the origin and main bio-chemical skeleton of this book, it should contain suggestions of some use to politicians and statesmen not so whelmed in practical work as to become machines in the hands of permanent officials. That any particular statesman now alive is likely to be influenced by scientific thought is not likely. But statesmen, perhaps luckily, die in time and mostly disappear before becoming by their cerebral rigidity a public danger. There do, however, seem rare signs even among some legislators that science, apart from that applied science which offers immediate returns, may be

valuable in ways not measurable in a balance sheet. Perhaps such a slight advance is indirectly due to a recognition of what science can offer nowadays in the way of offence and defence. This has led to open discussion of war and peace and the fate of nations, clearly cases of evolution. It may not be long before it becomes common knowledge that if all evolution of living things comes into the purview of the biologist, biology should be a study of public importance. For surely nothing can be of greater value nationally than a science which leads to a comprehension of why and how nations, as well as individuals, survive or perish. As soon as it is seen that biology alone of all the sciences has the definite task assigned to it of determining the means and methods of all organic construction, its tools, weapons, organs, and institutions, it will be apparent that the nation as a struggling, fighting organism must be viewed biologically. And here, I think, we come to a point where it may be said quite definitely what value studies such as these may have for the mass of mankind. If we agree with Bacon in his estimate of the harm that may be done by those deep deceptions natural and normal to the unthinking, it must seem better to know the truth of the biological conditions in which and by which we live than to exalt ourselves for a little while in a perilous paradise of peace, when there is no peace. It may be said, and indeed often is said most untruly, that man cannot exist without ideals. For the most part, aside from the ordinary and possible promises of reasonable hope, man can and does live without them, not without satisfaction. Many of his disasters are indeed brought about by the insistent urge of those who bid him expect miracles in his own time. Hence the tears of disappointment that bedew the cheeks of the enthusiastic idealist as he bewails the fate of the soldier and the citizen whom he forbade to prepare for, and even to anticipate, the continued struggle of nations, a natural struggle of competing organisms.

'PEACE' AND COMPETITION. I would not once and for ever turn down the efforts of those who seek for peace, even if only 'in our time' as the Prayer Book, with some biological caution, puts it, and later I hope to determine roughly criteria by which we can estimate the value of such efforts. But from any scientific view whatever it seems absurd to suppose that ignorance of the inter-organic struggle in which nations are for ever engaged can be anything but harmful and dangerous. If then in later chapters I venture to run the usual risks of rage, indignation, and ridicule by what may be looked on as a cold-blooded attempt to prove that war is as inevitable as disease and death, I believe it will be all to the good, provided that ignorance of the way organisms are built and live and die is dissipated. To know the world and stand up in it, and do it like men, is our task, even if, in what so many will objurgate as pseudo-scientific jargon, we are but protoplasmic units in a racial unit with all those deep, instinctive passions and desires to survive that we know as courage, endurance, pride, and faith in our own struggling, battling organism and nation. This is why, following so many biologists and physiologists, I have endeavoured later to show how the human, the mammalian, body is built up by conflicting elements, existing in sub-hostility, and is for ever at war, for ever in repair, and dies in the end. And there only finds peace. For those who can go further and are not so averse from the conception as to refuse to discuss it, I propose to deal, so far as my knowledge enables me without going too deeply into it, with bodily and organic construction on physical laws. Here too is to be learnt the fact, inconvenient to some idealists, that the very conception of energy implies continual struggle and power compelled to do work by construction and constraint. Thus familiarized with the world as it is seen by science man may learn to endure his destiny with stoical calm and more reasonable expectations. There is nothing in the general theory

forbidding him to hope for periods of Augustan or even republican peace that may be looked on as those rare intervals of positive apparent health which physiology treats idealistically as normal, but which pathologists and physicians so gravely distrust.

SOCIAL LIFE OF CELLS. However familiar the rough conception of the State as an organism is to some modern political students who, if uncommonly curious and conscientious, may have scanned a text-book of biology, it is fairly certain that few of them will have applied themselves with any ardour to studies in the construction and organic conduct of the animal body, its economy or general management and regulation. It has been difficult, and will doubtless continue to be difficult, to persuade even a small section of those engaged in special studies to regard a good general knowledge of allied sciences as essential to their own work. I have therefore to consider myself exceptionally fortunate in having been able to do so much as to print essays which can be looked on as intra-organic ecology, a study of cells, organs, and tissues regarded as acting in a zoological field as cell-colonies which live in relations attained and preserved with those increasing difficulties which end in somatic death. This view may not be so easy to adopt in face of the popular and utterly erroneous conception of the human body as a perfectly evolved instrument, but it should take little application for the student to see that the conception of the body as a number of evolved, evolving, and still imperfect cell-colonies, having 'interstate' relations with each other, is a political conception of great value. It is not to be expected that the politician should apply himself to the study of the endocrine organs, or ductless glands, of the body, but a little knowledge of them might help him to understand more perfectly the nature of his own difficulties when in relation with organized bodies of any kind from empires and nations down to turbulent com-

mittees among his own constituents. He would inevitably come across the subject of immunity and immunization and would observe, perhaps with envy and amazement, that continuous measures are taken by one part of the body against the pretensions and encroachments of other parts. He might even hear of Roux and the Struggle of the Parts and might possibly learn that I had reasonably described the social life of the body as a state of hostile symbiosis. Whether he found himself unable to use such conceptions or not he would not then be surprised if any compared physiology with ideal politics, and practical politics with the work of the physician, especially when he observed how well the physician understood that returning tissue unity in action meant recovery and increasing separation meant death. He would perhaps recognize that he himself might be in attendance at the death of nations.

SOCIETIES AND COLONIAL PROTOZOA. How far it may be possible to develop these conceptions fruitfully it is impossible to say. Yet I find it hard to believe that they may not prove as suggestive to a few as allied studies were to myself, when engaged on the first draft of this book. Perhaps it would have been impossible to develop what is suggested in the above section had it not been for the belief that some study of the protozoa, especially of those living in colonies, was essential if more was to be learnt of the actual life and habits of cells than was to be found in text-books. The very conception that cells could have habits, customs, and instincts, instead of merely tropisms and the like, was an advance beyond the text-books, and I soon discovered that what Ray Lankester and such men as Bütschli had to offer was of sociological and political value. At any rate I saw that politics might well take in fields unknown in Downing Street. Of the protozoa I shall have something to say later.

EVOLUTIONARY LAW AND HUMAN PROTOPLASM. It must

be clear that any social inquiry on the lines suggested will run counter to many common lines of thought and prejudice. To argue that mankind in masses evolves in accordance with the same laws that regulate the evolution, growth, and construction of simple animals appears to destroy finally the assumption that man is master of his destiny. I am not in the least interested in that question since my thesis requires the assumption, for whatever it may prove worth, that mankind on the plane of this argument must merely be regarded as protoplasmic units following biological law. This puts them relatively to the social organism among all other classes of protoplasmic units, whatever their complexity or pattern, as they must all conform to mechanico-physical law. On final physical analysis there can be no difference between these and even the cells, syncytia, or protoplasts of plants grouped in more or less rigid or fluent structures to carry out the functions of protoplasm, already a complex structure using solar energy. Spinoza said that no one knew what body (*corpus*) could do and suggested more investigation before calling in 'mind.' I suggest that we have since then gone far enough to inquire what protoplasm can do and whether in fact it does not do everything. For those who do not indulge in mystical speculation when studying biology the phenomena of zoology alone in its pure bionomical aspect might suggest its infinite capacities. It ought not then to strain the imagination of any to conceive that it builds up according to law the more fluent organisms known as nations or social groups of all kinds. For it need not take such as Burke to be aware that no man, or any number of men, ever constructed a social organism on intellectual lines. Provided the problem be handled without prejudice or dogma we are justified in regarding the agent we see doing the work as the one who does it. And that is protoplasm.

PHYSICS AND POLITICS. The suggestion that physics might have some definite lessons to teach politicians and students of

history might be attributed to Walter Bagehot merely on the strength of the title of his book on *Physics and Politics*. But curiously enough that seems the last mention of the science as well as the first and, judging from the sub-title, Bagehot appears to have thought Natural Selection and inheritance properly included in physics. But he criticizes Buckle as a materialist. What he would have thought of those who dare to suggest that the laboratory work of the physicist might teach the politician and even aid in making history a science, it is hard to say. Obviously my own view is that in any science whatever the general principles of action in all sciences may be used to illustrate, correct, and reinforce any conclusions reached tentatively. The intelligent student will not be surprised to find that not only physiological and pathological but also chemical and purely physical reactions have remarkable analogies in the physics of social organisms. This is by no means to state that the desired passage to physics has been achieved or will be achieved without much labour, even if I venture to think social phenomena may help the physicist himself.

MILL ON ANALOGY. It will seem to many that any adequate treatment of the subject mooted in this introduction must be beyond the capacity of man. To this I readily agree since I have no intention of doing more than making this a book of suggestive hints for such statesmen as are not slaves to the common but unintelligent distrust of all analogical reasoning. This is, however, a distrust that might be dissipated if students did but consider with some care some chapters of Mill's *Logic* and observe that resemblance of relations is the most valuable source of hypothesis and experiment.

CHAPTER II

THE NATURE OF ORGANISMS

DEFINITION OF AN ORGANISM. Were this treatise intended only for those technically educated in science the idea of the state or nation as an organism might be regarded without much argument as a reasonable working hypothesis, seeing that it is so often usefully employed as an illustration or analogy. Happily it is possible to call not only Hobbes, Comte, and Herbert Spencer as witnesses to its value, but a more modern authority. Sir Arthur Keith, in his paper *Does Man's Body resemble a Commonwealth?*, discusses the question and particularly inquires why Spencer, having reached the conception of the State as organic in *Social Statics* and elaborated it in his essays, *The Social Organism* and *Transcendental Physiology*, appears to have lost all faith in what promised much. Keith puts this down to Huxley, who was in some ways still dominated by the notion, so dear to eighteenth-century philosophers, of a Social Contract as opposed to Social Evolution. It is indeed doubtful if Huxley was ever a sound evolutionist in any pure Darwinian sense. As for Spencer, we know that his own scientific evolution ended in doctrines, held with more than firmness, which limited State action to a minimum and made him refuse to draw any of the conclusions his conception seemed to force on courageous thinkers. Thus with Huxley and Spencer both endeavouring to commit infanticide with Spencer's really legitimate offspring as a victim, it is not surprising that it almost perished. Keith states that the theory thus fell into neglect and disrepute and remarks that only one

biologist appeared to have implicit faith in it and had used it as an effective weapon of research by showing how the disorders and diseases which affect man's body may be elucidated by observing similar disturbances in the body politic. From this encouraging remark on suggestions of my own, and Keith's further conclusions, it is clear that he regards such work as soundly based and not as mere speculation resting on a rickety platform of unrelated resemblances. In this he is very far indeed from the average modern sociologist who associates the notion of sociology with an advance in free individualism, in spite of the phenomena with which he is confronted, and cannot bear any better than Spencer the notion of an inclusive social organism. His very dislike, however, does suggest that he grasps the theory of such an organism, loose as it may appear. But most of those who apply themselves to political or social thinking, being without any biological knowledge whatever, have rarely been able to conceive of anything but an animal as an organism. It is therefore well to see at once how far the common definitions of an organism can reasonably be extended to afford grounds for a working sociological hypothesis. If those to whom the notion is familiar consider this unnecessary I suggest that they should experiment with it on a few whom they have reason to think fairly intelligent.

J. S. HUXLEY ON 'INDIVIDUALS.' If we consider the word 'organism' in its etymology and discern that it means simply 'something which works,' it seems that its history has brought about the narrowing of meaning which hampers thought. For there can be no real necessity to keep it so narrow as to exclude all closely knit societies, run by protoplasmic units, except those inside a skin or epithelial integument. If Professor Thomas Huxley helped to put us into this difficulty, as Keith has suggested, it may be pointed out that his notable descendant, Professor Julian Huxley, has done something to help us out by his very useful little book, *The Individual in the*

Animal Kingdom. In this he classifies as 'individuals' wholes composed of unit cells, with and without division of labour, such as sponges, many corals, some protozoa, and hydroid colonies. And to these he is not unwilling to add committees, various associations, and human society itself. It is, however, curiously interesting to see that all through he never permits himself to call any of these composed individuals 'organisms.' This I feel was due to the extreme caution which the necessities of a professorial career impose on the younger votaries of science. It is not permitted to them at an early stage of their evolution to enlarge the boundaries of thought without danger. Whether the younger Huxley would now venture to call any closed working system an organism is a matter on which I cannot presume to speculate, but it is fairly certain that the less cautious with nothing to lose might do so without his severe reprobation, seeing that he is quite ready to call such a peculiar entity as a social club an 'individual.' As such an unstable fluctuant body has a semi-permeable external membrane for defence against outsiders and a continued life with definite functions carried on by living protoplasmic units, I could myself call it an organism without anxiety or trepidation.

EXTENDED DEFINITION OF ORGANISM. That all social animals may act as organisms is easier to grasp if it is once recognized that what most people would naturally call an animal is not so closely knit an organic unity as they are apt to think. It is not made of one tissue or one kind of cell, nor are all the cells definitely and for ever positioned. The animal is indeed a vast empire or republic made of many billions of highly differentiated cells struggling to live and function in the presence of each other's secretions and excretions while stressed, stimulated, or inhibited by all the difficulties of the external world. And just as a tiny organism if greatly magnified would necessarily be seen as a highly com-

plex social set of varied cell colonies, loosely attached in some kind of symbiosis, so if any great social organism, or organic part, such as a city, were seen by some extra-mundane intelligence through a minimizing glass, it would undoubtedly appear as an organic unity, not far removed in type from an amoeba. I shall not deny that to say so is to repeat commonplaces and can only urge in extenuation that to recognize a commonplace is not the same thing as drawing conclusions from it. If it were there would be no common popular objections to an extension of the meaning of organisms, and little need to continue. But in one extension of the argument I am able to rely on personal observations which many can easily corroborate. I refer to the conduct of social semi-domesticated and wild animals which move in droves.

SOCIAL ANIMAL 'ORGANISMS.' In the case of these animals there can be no question that, whatever conclusion they drew from it, many observers have recognized the striking likeness of large massed numbers of sheep, horses, and cattle to a single organism. I have frequently noted such phenomena in mobs of horses numbering many hundreds and also in cattle, but the purely organic reactions of these bodies are best observed in a moderately large flock of sheep upon open country, such as an English down, an American prairie, or an Australian plain. I am the more inclined to describe these phenomena briefly because it was by personal observation of them that I first learnt to think organically of what I had then never heard described as organisms. It was upon the prairies of north-west Texas that I learnt most. With the smaller numbers dealt with there, which are corralled at night and only let out with a sheep-herder by day, habits and customs could be observed that with tens of thousands were obscured and hidden. For when such sheep are loosed from their corral to feed on the range, they move up wind if possible, in a closer or looser formation and at a faster or slower rate, directly

proportional to the strength of the wind and to the temperature. If, however, the wind increases greatly they turn away and cannot be forced to feed against it. When the weather is cold the flock is compact and moves fast, as the sheep eat with a hasty snatching motion, but when the sun rises the pace slackens and when it is really hot they cease to move and spread out widely from a common centre. Up to a certain heat the area on which they feed is enlarged and the distance they keep from each other goes on increasing. But if at such a time a gun is fired or a strange dog barks they close in compactly and stand facing outwards. When the alarm has passed the organic amoeba-like opening-out of the flock begins again. When it is very hot at noon or afterwards they cease to spread but break into small patches, so close set that they can put their heads in the shadow of each other's bodies and remain passive till the heat of the day is over. They thus act as a whole directly on stimulus or inhibition like a true organism.

BIRD MIGRATION. The actions of migrating birds on the eve of their departure have often been noted as deserving the epithet 'organic.' That their mechanical perfection can be due to instinct alone must seem at least very doubtful to those who have watched tens of thousands of swallows performing their flight drill over such a clear area as a great lake. If their skill is the skill of an organic, if temporary, unit, it seems possible, or at least more possible, to comprehend. These displays suggest means of inter-communication among the units which, being obviously not purely or directly nervous, must be attributable to the reactions most easily and perhaps reasonably to be called organic and directly physical. The connection among the units may almost be called molecular. The employment of such terms looks unjustifiable but it might be suggested that by observing such phenomena we may, perhaps, facilitate the 'passage to physics.'

PROTOZOA: GROUP ORGANISMS. However interesting and suggestive these phenomena are, and they could be many times multiplied, it is probable that the Protozoa, which are single-celled animals living alone or in groups, afford better examples of group organisms. It is these groups which most nearly resemble the Metazoa to which all animals properly belong. These single cells vary in size from a thousandth of an inch in diameter up to a diameter of an inch and even more in some of the plasmodia of the Mycetozoa. Many of these colonial protozoa living in settled groups are not at first sight distinguishable from low metazoan organisms. I have elsewhere suggested that it is probable the Metazoa themselves originated by a failure to complete fission in an early protozoon, which thus could not divide into single and solitary or social cells. When I have to speak of the part disaster and making the best of disaster has played in evolution, this suggestion will, perhaps, be seen to have some reason and likelihood in it. It is impossible here to dilate on all the analogies between organisms that are animals, or groups of animals, and these colonial protozoa. Work by Ray Lankester and Bütschli long ago made them familiar to zoologists. But it was early pointed out by the physiologist Verworn how like these were to social organisms. In these cell-committees of colonies are to be found many peculiar analogues to forms of government possible in groups. In some, such as the *Magosphaera* globule, all the cells on the outside are furnished with cilia, but these do not act independently, though they are really separate. They work in true symbiotic union and propel the globule on one impulse. They are in fact a component of the whole colony's movements. These colonial 'organisms' live in an infinite number of ways: in mere cell heaps such as the *Labyrinthula vitellina* or in a network on stalks which the protozoan cells themselves make. These stalks may join together and form a definite social structure. Some colonies

make a capsule and live in it. Many of the flagellata provide gelatinous coverings and form colonies which are spheres, while some branch from a common anchored stalk. Some live on a horizontal plane, each outside cell armed with a flagellum, while the inner cells have none or do not show it. They may be said to resemble massed bodies of animals on the defensive. The colonial units of *Volvox globator* are connected by intercellular connective fibrils. Some protozoa live together in inseparable colonies. Thus *Proterospongia Haeckelii*, a colony of flagellate infusoria, is very like a living organized sponge.

Many more examples could be given of the way these groups and such communities as bees, ants, and termites resemble what we more commonly know as organisms, but there is surely no necessity to labour the point that, whatever the groups, the laws of organic development which produce order, form, interdependence, and differentiation are everywhere the same. Every successive inquiry into the nature and functions of a great social or national group will confirm the conclusion that where protoplasmic units, however simple or complex, work together in symbiosis or communal life, they can best be considered as organisms and as such liable to the diseases and disorders which change or destroy them.

CHAPTER III

THE ORGANISM AND POLITICS

THE ORGANISM AND HISTORY. The very simple examples of organic groups acting under physical stimuli as 'animals,' though superfluous for many biological students, may enlarge the range of those not yet capable of regarding the words 'social organism' as more than a useful phrase. There is little doubt that it is commonly held to mean no more than that differentiated social parts act and react on each other. The conception of a nation as a loosely knit organism striving to survive in a zoological field and displaying physical actions and reactions, such as expansion and contraction, characteristic of life from an amoeba to an empire, assuredly occurs to few. But even if the argument is so far held sound, it is probable that the next question to be asked will be what use can be made of its results. Is it seriously put forward that sociological students should apply themselves to science generally and biology in particular? It may be said at once that they would obviously be better for something like such a frame of reference. The new relativity has in many cases corrected faulty ways of thinking. That it or any other theory has yet taught historians to 'make sense of history' may be doubted. And yet sociologists are still being told to rely on the Historical, or Mill's Inverse Deductive, method to establish by deduction the principles of sociology. Since I propose here to use the analogical method which, by Mill's own allowance, may amount to complete induction, it seems preposterous to abandon direct observation for the Historical method by which preliminary inductions of a highly uncertain

order are reached in a study which cannot pretend to be science, and then to argue from the uncertainly based to more uncertain conclusions. If this is the way in which the principles of sociology are to be arrived at there seems little reason to hope for good results.

EVOLUTION AND LAW. If these considerations are correct it may be found that, instead of history elucidating sociology, a sociology based on biology will elucidate history. I do not consider myself competent to decide what are the reasons, justifiable or not, for the contempt into which history has fallen, especially with those instructed in scientific method. But as the point is of considerable importance it may be said this contempt is probably due to historians failing to establish a reasonable historical law of evidence. So far as I am aware, few, if any, great judges or jurists have ever turned from law to general history. Had they done so they would, we may feel assured, have naturally tested their conclusions by the great articulated skeleton of law as a frame of reference. But how many historians have a sufficient knowledge or understanding of law to guide them? If it is asked how law could help them the answer must be that the great scientific value of law lies in its being a definite and almost diagrammatic picture of evolutionary growth. It should thus be affiliated to biology and science generally. In a later chapter, dealing with the general principles of evolution as applied not only to social organisms but to the origin and growth of their working institutions or organs, it will be shown why the skeleton of law is spoken of as articulated and why this organic connection of its stages 'makes sense' in a way the amorphous masses of history have never done. This means that law is as definite a record of past social evolution as an arranged evolutionary set of shells may be of a mollusc, living or extinct. Some lawyers appear to have a dim consciousness of the actual machinery or mechanics of these changes in law which resemble the changes

in biology known as adaptations. It may be that they learnt the wariness which characterizes their tribe by observing that intellectually designed amendments to law, especially if founded on the synthetic judgments *a priori* of doctrinaires, rarely do what they are framed to do and often have unexpected and dangerous results. If this consideration leads to the apparently cynical, but assuredly sound, conclusion that the best, if not the only, way to mend law is by *ad hoc* repair tested by trial and error, it will look to some biologists as if the lawyers had the root of the matter in them, however little they may know it. It should be plain presently that evolution does not work by planning but that organisms, social or somatic, work, change, and succeed, when they *do* succeed, by trial and error.

PHYSICS AND HISTORY. If this is thoroughly understood, so much the better. But it may, perhaps, be granted provisionally, though not with full assent, and for those who will go no further it may be argued that sense or congruity does begin to appear in the anarchy or sheer chaos of history when some of the principles of biology are applied to its mass rather than to its unreduced particulars. For, no sooner do we obliterate the needless gap between history, pre-history, and anthropology generally, than history, no longer written in minuscule, sprawls broadly across the map in biological letters. The origin of tribes, their struggles, amalgamations, and final destruction or emergence as tentative nations about to endure similar ordeals have been so simplified that they can be related to the allied but superior phenomena of physics, even as it was shown in the last chapter that the simplest mass 'animal' responded directly to physical law and physical stimuli. For when thus reduced in scale it is by no means difficult to illustrate all such social phenomena, great or small in space or time, by examples of action familiar to the chemist and physicist, as I hope to demonstrate when dealing with some large-scale international phenomena.

SOCIAL PATHOLOGY. It is, however, by introducing into sociological thinking the conception of social pathology and thus linking it to the general theory of disease and disorder that the greatest advance can be made in the study of social phenomena. But if we may use pathology, it will naturally be asked why we should not prefer the conception of physiology as indicating health and correct function rather than ill-health and disorder. The answer, perhaps, is not so obvious as it might be, since even many advanced students of medicine are apt to speak of physiology as concerned with the normal or average functioning of the body instead of with its ideal functioning, that is, a desirable state which never exists. Sociologists have tended to the same error in the greatly over-audied conception, due to Comte and Spencer, of Social Statics. This is supposed to deal with social structure, and no doubt the notion may be made useful if we correct it by the necessary statement that social structure as a whole, and indeed in every part, is not only plastic but continuously undergoing change. Thus Social Statics and dynamics may be merged in Social Kinetics, and as soon as this is recognized it will be seen that with everlasting movement there is bound to be more or less over-stimulation, or over-inhibition of function amounting in all cases to loss of ease and order and in some to positive disorder and disease in the common interpretation of the word. It is for this reason that I regard social pathology as throwing most light on social structure and function. This will be demonstrated when we come to speak of repair.

BORDERLAND PHENOMENA. Nothing can be more certain than that what is called normal physiological action is for ever on the border and even a good deal over the border of pathology. There is, in no animal, ideal general health, though most functions may work well enough to compensate for partial failure in others. It is obviously the same with national organisms, which know nothing like perfect health. Sober consideration

of social phenomena will confirm the conclusion that a difficult and even dangerous state of balance is really normal in all organisms of whatever order. Thus return to normality is but the prelude to the return of threatening symptoms. If this seems depressing to the idealist in politics it should on the other hand encourage the pessimist to believe that society is no more likely to perish at once than he is likely to die because he feels unwell. The sooner all orders of political thinkers perceive that they are, even in their separateness, combined parts of a living organism, the better they will appreciate the value of most political remedies offered for social diseases and disorders. If they discover that these are largely valueless they will also learn why they are valueless and may learn to take more sceptical views of all political remedies. A very little knowledge of social pathology as a possible branch of general pathology should help to divide social physicians from social quacks.

POLITICAL THEORIES. It is possible that some students may agree with the notion that these conceptions of social pathology do at once, and powerfully, reinforce the theory of the organic state or social organism. If henceforth I take that theory for granted it may still at times be worth while to accentuate any particular corroboration. We have, at least, arrived at a point where we may begin to discuss some important political questions involved in the theory, especially as many of them are necessarily concerned with more or less pathological conditions. Taking into consideration the morbid fears of all political parties as regards the actions of their rivals, can we say now, and at once, if the general theory of the organic state favours one political theory or party more than another? Keith's very cool view and Spencer's rather absurd fears might indicate that the argument makes for autocracy and slavery, however we define these, but a close scrutiny seems to favour no defined political rule, perhaps for

the too simple reason that neither a State organism nor any animal organism is ruled or run on anything like schematic or theoretic political principles. For these theories and the picture they present are as like the reality as a paper diagram of the heart's action to its true activity. They do but represent the various interests and prepossessions of parties towards tyrannies, aristocracies, oligarchies, and democracies, most if not all of which are logical notions *in vacuo*, since no organism of any kind ever worked except by the rhythmic interplay of group energies only roughly capable of interpretation on theoretic political lines. It is, indeed, not too much to say that all organisms of whatever order are ruled at once by tyrannies, by aristocracies, and by democracies, and the political and somatic struggle alike is merely about the share of each and is not directed to the destruction or prolonged negation of any while comparative social or somatic health exists. Such health is in fact the balance of forces, which otherwise would be destructive. On this particular point much remains to be said. As regards the political point I merely remark here that, however an organism is ruled, there is always an oligarchy of a kind which seems to be, but never is, in possession of real control.

THE CASTE STATE. Keith's theory that the animal body is a slave state is founded on the assumption that a society of castes is, *ex hypothesi*, an assemblage of graded subordinates. The human or animal body is assuredly organized into hereditary castes with their work determined by the embryological mechanism of growth and differentiation. But whether action and status of this kind constitute slavery is a question for metaphysicians rather than biologists. Nor should it be one for sociologists who are not predetermined to some theoretic of individual freedom. In any case, if hereditary castes do their work easily it is hard to know what politicians not wedded to irrelevant standards could desire better in a healthy state. We

need not discuss the vain refinements of theoretic liberty. What are of more interest are the processes which appear to precede caste development, for in these processes politicians of all orders may find some phenomena to encourage them, even in their special beliefs. That all such beliefs represent the trend of forces which when balanced make for social stability will demonstrate itself in the course of the argument. But in the meantime it may be asked whether there is any sign in the animal body which suggests factors of which the most prejudiced, and hence most simple-minded, democrat might approve. He would surely pick the fact that however much he disliked the caste system in theory it had at least worked out one health problem about which he and his fellows had long been fighting: the proper nutrition of all social units to fit them for their proper work. How long it will yet take to carry this out in modern State organisms is beyond conjecture, but it is certain that the states which achieve, in their more complex stages of evolution, that which was a matter of course in undifferentiated tribal unity, will have freed themselves from a grave handicap, since in any organism nutrition is a dominant factor, and its failure is liable to lead socially to that form of de-differentiation known as communism.

PHYSIOLOGY AND LIBERTY. If it is more than possible that social doctrinaires with theories of free and equal units in an equal paradise will be dissatisfied with less than their visions, the mere worker of the day may not find it discouraging to have physiology on his side so long as social evolution is unimpeded by hostile organisms. He may, perhaps, feel more hopeful than the aristocrat who, on the organic theory, is promised so little in the present and must travel far to reach the evolutionary stage represented in the body by the increased, or apparently increased, authority of the cerebral and spinal nervous system. But political workers who feel their essential relationship to such tissues will find some

philosophic consolation for delay in reaching such a status by noting that while the untold masses of working cells in the body do their work and perish, the highly endowed brain and nerve cells of which he conceives himself the early political analogue are lapped in lecithin and luxury and live for ever, or at least for the life of the body they help to rule.

SOCIETY OF THE BRAIN. Whether it will console the more urgent democrat to observe these phenomena it is hard to say. But it may make some pause in action when they consider the curious but indubitable fact that in their own bodies are to be found methods of rule, proved sound in practice, which in theory they abhor. For what is the brain, which the over-logical are ready to obey like slaves, but a somatic assembly of would-be dominating aristocrats, a cerebral senate or House of Lords?

THE BODY AND POLITICAL SYSTEMS. Such considerations may be thought over-curious and of little worth, but they all help to show that the evolutionary growth of regulative organic action has worked out, not as a system but as a set of systems of rule, which is far too complex for political labels. For what notice does the average politician take of the instincts of the herd, of which something must be said, although as part of the herd he works on those instincts? Most are ignorant of the fact that words and party cries have no validity in themselves except as indicating instinct and even purely physical processes. The 'instincts,' or rather tropisms, of the various colonies and classes of the mammalian body work themselves out in secretions and excretions, which in evolution have become hormones and messengers regulating growth and actions. The body does not work only by mere messages, intellectual or pseudo-intellectual methods, but by what Keith aptly calls 'postal packets.' These are the secretions mainly of the ductless glands. This is where the somewhat top-heavy social politician is so apt to err when he wonders why some-

thing is not seen at once by intellect. He may in the end learn that nothing political is achieved by intellect, a bitter lesson to those politicians who really have brains. They learn to know that their brain may even nullify all they attempt while the instinct-founded fool gets something begun or even done. Thus the picture of the really intellectual politician, though often pitiful, is profoundly instructive. We again come to the conclusion that, though we can find all forms of political action in the bodily organism, there is nothing in it that supports a special school of politics in the social organism. But when we think of the myriad ways that perilous stuff protoplasm builds up with fearful inexhaustible energy so many creatures to toil, suffer, and perish, it seems that a philosophical view affords encouragement for every order of political action. Organic materialism thus interpreted affords every politician, who has effective support behind him, justification for his existence. Physiologists will recognize in all these conflicts and constructional compromises something analogous to the work of the ductless glands. The interaction of these glands *is* the effective governance of the body. In the body even partial senility of a gland may bring about death. The social organism, being such a low-grade 'animal,' need not thus perish. It changes easily whatever political noise is made by those disturbed. Even a revolution regarded as historically great may be a mere incident in the life of a national organism. And what is of more importance, it may often be an effort to restore health. It has been said, or certainly can be said, that nations have the revolutions they deserve. Of this I shall have to treat later. Here it is more relevant to note that the allowance in succession of the objectives, or part at least of the objectives, aimed at by political groups with the power to cause disturbance, is the best guarantee against grave social disorder. It will be shown in the following chapter that political failure, with attempted

repair by the next party in power, is not just an unsatisfactory method of carrying on social business but that it is, in spite of the common party assumption that their opponents in power mean the ruin of the state, the only actual and practical method of social political growth. This will be found to apply generally to all those functional disorders, even the most serious, which have been demonstrated as constituting everywhere the normal processes of life and evolution. I shall not here attempt an analysis of the dictator state, of which calculated and destructive suppression is a feature, but it may not be without relevance to remark that real organic social and somatic disease can be, and very frequently is, brought about by the denial of internal political function. For political energy will do work, if not openly then in secret. 'Red' groups as self-originating causes, although a favourite political conception, are thus purely symptomatic and should be regarded as such by the least intelligent politician.

DEATH OF POLITICIANS. It is easily seen how social conditions tend to become rigid and lose all plasticity. In the same way the common political brain, which is rarely of a high order, can get hardened. It has already been shown that sound arguments may readily be discovered to defend conservatism. And equally sound arguments are at the service of its opponent. This common partial and opposed opinion in varying balance is the apparatus necessary in social health, change, and new construction. Fortunately there is in social as in somatic organisms a normal way of avoiding most of the worst disasters apt to follow on rigidity. Social disease and death may be deferred and continually are deferred by the death of obstructionists. By a beautiful natural process over-advanced political thinkers tire, wear out their energies, and perhaps become sufficiently conservative to enter and modify a senate by what remains of their youthful ways of thought. Their retreat from a busier field of action, where

they were once a danger, will now be the removal of a drag. These are all natural and healthy processes which can be paralleled in the animal body. By them metabolism is kept at a reasonable level of activity in a social organism not gravely disordered. There should be nothing repugnant in this to politicians if they will but recognize themselves as biological and physiological agents not to be praised or blamed but studied in their functions. It is not difficult to recognize in a social representative something remarkably like a hormone, one of Keith's postal packets, emanating from, or secreted by, a social group or tentative inchoate 'gland' which might presently be of great physiological consequence. The hormone, or messenger, will not be exalted for wisdom or scorned for folly by the biologist, but observed with curiosity, since he will be apt to infer from such more or less normal phenomena how destructive or anarchist groups come into existence.

PARTY AND INTELLECT. The alternations of party are plainly physiological. The retrograde politician has to clean up after the ever-busy advance guard has done a little good, not a little harm, and has retired in disorder and dismay. The reform party will again be recalled to destroy the work of socially static units convinced that by sound work they can keep things as they are, not knowing that they invite violent reaction. That the processes of life, health, and disease in the body throw light on all these political processes is too obvious to be denied. The optimistic philosopher is apt to think that if the more obscure somatic processes are indeed hard to diagnose, he ought, or politicians ought by their intellect, to foresee and forestall the dangers of such a disease as violent communism. A biologist, or biologically minded sociologist, is, however, inhibited from thinking that the growth, disorders, or decay of society can have any relation to the intellect.

MORBID NORMAL PROCESSES. Earlier it was stated that

from this direct study of politics there should emerge something like Mill's desired middle principles. It seems to me that one emerges which would be definitely repugnant to Mill or Comte. For instead of history throwing a light on sociology, we must, as I suggested tentatively, pursue sociological studies with a view to understanding history. In this way we can comprehend, or begin to comprehend, the hidden stream of events leading to violent historical crises. That we could thus learn to avoid them would be to go beyond the bounds of legitimate or scientific hope. For if the origins of a grave social disaster lie hidden in accidents forgotten for centuries, even as the death of a man may be traced to some forgotten incident of his childhood, it will take more than mere genius to draw fruitful lessons from pure history. But if inchoate sociology, with the help of somatic physiology and pathology, can demonstrate that morbidity or disease and disorder are, and must be, a necessary process in all organic evolution, it seems that even politicians might be persuaded to study a reasonably founded sociology, as an adjuvant to social diagnosis and a solvent for historic prejudice.

DISORDER INEVITABLE. If then disorder is inevitable in all growth, which we can call progress if we will, it is not surprising that politics shows signs of it. Each party or section of a party will exhibit the characteristics of those who elected them. The very nature of a popular assembly should thus indicate lines of action to an instructed sociologist were it not that the forces concerned are relative to numbers, not intelligence. Nothing but a perfectly natural *odium politicum*, which blinds politicians to easily observable phenomena, can be looked for. But what cannot be done by intelligence may be done by events. It does not seem impossible that politicians should learn, perhaps by force, that in a living organism there is a continuous and rhythmical need to mend or at least oil social machinery. Thus these problems arise as naturally

as they do in the wear and tear of engines, whose 'song' gives encouragement and warning to the engineer.

I shall now go on to treat as briefly as possible the pathological side of organic social life. This must include a physiological and medical study of organisms and their possible breakdown when positively over-stressed, or when bodily or social structure grows too rigid to bear normal stress. When it is seen that the analogies suggested have such real meanings as the number of instances may discover, it will be found that this medico-physiological and socio-pathological view of political studies in the body and the social organism begins to make more sense of history than vaguely reasoned work on the incalculable spray of documented events. That not a few of the conclusions will be repellent to historians and even statesmen with a high blood-pressure is perhaps inevitable. Students with their passions not yet deeply engaged may find it worth their while to analyse while they can all forms of political prepossessions with the view of discovering a single and preferable rational or natural means of government, which can obviate, or even hope to obviate, disorder. They are, perhaps, little likely to find it.

CHAPTER IV

THE EVOLUTION OF STATES

PHENOMENA OF THE CROWD AND HERD. In the last chapter an endeavour was made to persuade the politician as a curious sociologist, since such must exist, to inspect the more obvious features of the organic State displayed in his own prejudices. He will, of course, more readily admit the status of opinion as prejudice when he observes it in his opponents. But the very notion of a scientific sociology, if its existence be possible, must imply that on analysis these apparently superficial prejudices are the result of causes too deep-seated to be put into intelligible relations with each other except by biological methods and, finally, by the physical laws which govern the exhibition of all energy. An easy approach to the problem exists already surveyed. After the passions of units, however we define a unit, come those of small aggregations, assemblies, and crowds, especially of those which are impermanent and therefore the less resemble organisms, or organic parts of a semi-permanent body like a parliament. These fluent and passing bodies are what J. S. Huxley would probably call 'individuals' possessing some transient organic characteristics. Huxley strictly refrains from giving any of the permanent aggregations of his classified individuals the name of organisms, even those for which I definitely claim the title. His book should be read by the student before going on to investigate crowds, on which subject Gustave le Bon, in *La Psychologie de la Foule*, did a remarkable work not even now displaced. Its value must be acknowledged when he deals with temporary aggregations such as juries, committees, and the like, where the cancelling

of the more personal characteristics of the individual units of the passing mass 'individual' allows and even compels the exhibition of the deeper passions and prejudices and their instinctive bases. For examination of the phenomena shows that the greater the aggregation the greater its reliance on instinct, its increased suggestibility, and its inability to use reason. These facts are well known to the police of any great city, who are aware that the only way to deal with a dangerous crowd short of actual violence is to split it up. I believe le Bon has noted what struck me personally as the most remarkable thing in such a crowd. Its units have common physical characteristics: an onward predatory walk, flushed faces, staring eyes, and clenched fists, which combine to make all its members strangely alike in aspect. With this is apt to come a total loss of general social inhibition: it is a mass animal void of fear. It is in such studies that we may get to the basal zone of primitive human action and even organization. For there is a curious but very obvious likeness in a predatory crowd to a tribe on the war-path. Such considerations may lead at once to the study of the factors in permanent social organizations ably dealt with by Wilfred Trotter, an eminent surgeon who has used his scalpel in the *Instincts of the Herd in Peace and War* and has laid bare many of the more remarkable phenomena of gregariousness. He had the help of Freud's powerful weapons of analysis and having used them says that, though it may be very necessary on occasion to disagree with Freud, there can be no doubt as to the value of his work and its range of influence on contemporary thought.

BIOLOGY, HISTORY, AND ANALOGY. It is, however, not my intention to use psychology any further than is absolutely necessary, since it still lacks a sound biological foundation and therefore remains little more than skilled guesswork. Here Trotter is of great assistance, since so far as the herd is concerned

he is primarily a biologist. I derive special encouragement and satisfaction from his attitude when discussing attempts made 'to apply biological principles to the interpretation of history and to the guidance of State Craft,' especially those made since Darwin. To his mind such efforts, like those of an earlier century to reach a philosophy of history, are from the scientific point of view mostly beneath contempt, either because they lack any notion of what science and scientific methods mean, or because they are nothing more than a defence of some particular political doctrine. Trotter thinks it needs much courage now to continue work on biological principles as concerned with human affairs, after such exhibitions of prejudice and incompetence. In this we may agree with him, but I profess that such attempts on my part are less discouraged by such folly and my own possible incompetence than by the rigid determination of the English race to decline using reason for anything beyond the computations of school arithmetic. And it may be added yet again what an obstacle to investigation must be their obstinacy, even in many capable of occasional thinking, when they ban analogical reasoning as if analogy had not a high place in logic. It is, therefore, with regret that I note that Trotter, after arguing in analogy all through, desires 'to be reasonably careful of arguing from analogy,' a saying which might destroy faith in work less well done, since analogies are the likeliest parents of fruitful hypotheses *teste* John Stuart Mill himself. But Trotter's sketch of biological work as fundamental in politics has done more to render it possible to reason biologically than anything else written in English. In itself, however, it does not appear to me to have succeeded in effectual statecraft, as he employs at times a psychology not really controlled by biology or strict logic. In such experiments in thinking it is above all things necessary to avoid avenues leading to ideal conclusions. Trotter seems to err in this way when he speaks of the perfect

social unit 'which Nature has so long foreshadowed. . . . A new creature, recognizable as a single entity: to its million minded power and knowledge no barrier will be insurmountable: no gulf impassable: no task too great.' There is enthusiasm and excusable hope here if there is no true vision, and it is a relief to a somewhat solitary student to hear the State spoken of so clearly in terms which imply that it is a true and not merely a metaphorical organism. But when we are bidden to expect an era of perfect social life without egoism, hatred, harshness, or arrogance I seem to hear the flushed advocate of idealistic communism, rather than the clear-minded surgeon and biologist.

IDEALISM IN POLITICS. For let it be considered what this perfect unit means. It is, we are led to imagine, a world state, a world organism, functioning as perfectly, say, as the imperfect still evolving human and mammalian body. This can be conceived as a potentiality and later I may find reason to defend it as such. But the main business of the biologist is not with potentialities, which may well be left to the would-be philosopher as a playground. For in this process of world evolution what will become of the State organisms we see now in the throes of internal evolution even as they struggle to survive in the zoological field? They must for the most part be swallowed or conquered while other competitors arise to fight and perish. It seems easier and even more rational to conceive, as many of the more hopeful do now, that national units will at last learn to live in internal peace and with external relations ruled by agreement. But have we learnt how that can come about whatever time we allot to the process? It seems that so far nothing has been heard of any machinery of State evolution beyond natural selection, which, as now admitted on all hands, gives no real clue to the origin of the variations which cumulatively make somatic and social construction alike. It seems as if the writer whom we are now

considering, while recognizing the State as a quasi-animal, an individual entity, and possible organism of a low grade, goes on to fit to it the organs and endowments of a high-grade organism, and when doing so relies on a somewhat crude Darwinism. But to argue these points on the basis of the survival of the fittest is to beg the question. I am bound to emphasize so much in order to clear the ground before putting before those interested in social evolution suggestions on the evolutionary mechanics of variation which may make a new weapon of social analysis. Or so I hope to show. How far these suggestions apply to the general theory of variation and adaptation in the animal body will be shortly discussed in the following chapter. That orthodox biologists will accept any variation in their fixed type of creed is unlikely, but fortunately in social evolution the main difficulties of transmission in heredity do not apply.

H. G. SUTTON AND SOCIAL PATHOLOGY. And here it is necessary, or so it seems to me, to refer once more to the influence Dr Sutton had on the genesis of this work. It was his conception of a society sick and suffering as a whole, which not only suggested a city, a state, a world, as organisms of different grades, but gave at once the powerful conception of a true social physiology and pathology. How far Sutton or myself, as drawing authority from him, may be reckoned as anticipated I do not know. The notion of sickness in a State is very old, far older than the suggestion of Turkey as the sick man of Europe would make it, but the common use of the phrase may be held to imply that whatever slight functional troubles the other States of Europe had, they were at least not sick or in danger of organic mischief and death. We see again that all such suggestions were regarded as loose analogies permitted to the rhetorical politician or the journalist ambitious of the picturesque. The conception that disorder in a nation is disease, which need not be written dis-ease, was, and still

is for the most part, wholly alien from common thought. It is, however, possible to use logic as we may use an equation and find conclusions both useful and surprising. For when once a country is seen as a suffering organism trying to do its best, and like a sick dog licking its own sores or biting at its own wounds, it becomes possible to lose sight of mere units and to see the whole as something on which a State physician might exercise his clinical ability. And if that is observed clearly it is but necessary to convert the equation to another form and it 'naturally becomes' a demonstration that here is a subject for social pathology and even for social physiology, the never attained or attainable ideal of state construction and function.

DISEASE, CURE AND REPAIR. When this stage in analysis was reached it became necessary to ask how we are to distinguish dangerous and fatal disorders from passing functional and perhaps adolescent troubles. It now appears remarkable to me that it took years to reach the absurdly easy and obvious conclusion that disease and disorders in States as in man the animal were either fatal, capable of alleviation, or actually curable. But most light came with the conception that 'cure' was a doubtful and dangerous word to use and that 'repair' was the one needed. Since I am clearly trying to put down roughly my own processes I may be borne with if it is said that even with the tool of repair as a weapon it took long to appreciate its full value. But it helped to show how little was known by myself and others of repair in a physiological sense, or of the pathological states which called for it, or of the stresses which brought on fatal or reparable mischief. I therefore determined to apply myself seriously to the study of disease, and it was during that period of probation among all the sciences ranged under the heading of biology that I learnt the apparent power of the instrument 'Stress, Breakdown, and Repair' when it was applied to mammalian construction.

That I say 'apparent' is due, not to any later doubts of its power, but to the fact that orthodox biologists naturally refuse to accept it and remain faithful to their creed. For it is strictly forbidden to admit that persistent stresses acting on masses of specific units can result, whatever length of time they persist, in heritable changes and adaptations. The work done by myself in mammalian variation and construction must therefore wait for orthodox confirmation until there arise other biological prophets than those who in their youth knelt at the shrine of Weismann. But when it comes to societies and the construction of social organs and institutions no contradictions on grounds of heredity can be raised against a theory and practical method which prove themselves.

SOURCES OF VARIATION. For the sake of the younger sociological student, who assuredly has no natural bias towards this rigid side of orthodox biology, I propose to say something more of stress, breakdown, and repair in the evolutionary construction of the animal body as well as in changes of social functions and institutions. For the more these factors are considered the more likely it grows that they discover a universal law operating throughout all evolutionary change as the main cause of variations which appear successively and act cumulatively in construction and function. This aspect of variation has so far received no generally accepted explanation and has therefore led to many forms of semi-mystic preformationism, as well as to theological and teleological arguments. It may be repeated that on this most important point, the origin of variation, Darwin professed his profound ignorance. A surviving and by no means negligible school of biologists still supports Lamarck, who maintained, not always with necessary caution, the transmission from generation to generation of altered characteristics. What he lacked to prove this in a reasonable measure was a definite apparatus. This I believe can be found in the theory of

stress, breakdown, and repair, for in face of it the origin of *ad hoc* variation ceases to be obscure. A strict adherence to a general mechanico-physical explanation is not likely to be resented by sociologists, who have before them all the mechanical and constructional activities and variational adaptations of their own field of inquiry. And these pertinent activities are bound to include among them such a subject as law in all its linked evolutionary variational phenomena from the *themistes* of the patriarch or the elders of the tribe down to the Praetorian Edicts of Rome and our own case-made, or judge-made, law, as well as the latest work of the House of Commons which so clearly displays the 'stop-gap,' or repair, as the very fountain of legislation. For, though few recognize it, the laws of evolution apply everywhere. The sociologist therefore may not unprofitably inquire into the variational history of his own tentative science as it endeavours to function in explanation of social action. He might discover that his own latest argument had its origin in an endeavour to stop a leak in his master's theory or his own. And so with metaphysicians or theologians as they build their cloud castles in Nephelococcygia.

In the following chapter I shall therefore deal very shortly with some examples of breakdown and inherited variational repair in the mammalian body. Sociologists may find additional reason in this study for the recognition of the general law suggested.

CHAPTER V

THE MAIN SOURCES OF ADAPTATIONAL VARIATION

FUNCTIONAL VARIATION AND INHERITANCE. That the average man is incredulous when told by biologists that the habits and efforts of his ancestors had no influence on his physical construction and that his own cannot determine the least change for the better in his descendants, is of slight scientific value. Yet the contrary belief seems of some social importance. The fact that the conventional view is found depressing, not merely by the uninstructed but by many who have read deeply, therefore makes the question of hereditary changes in animals as in other organisms relevant to this inquiry. It may encourage the doubtful to learn that the controversy is by no means settled by any theory or combination of theories, although the orthodox biologists have shown unexampled industry, and, it must be owned, the most extraordinary ingenuity, in their attempts to give a convincing explanation of the origin of adaptational variation. It is with regret that those still unconverted turn away from the scene of such labours in hypothesis. But when during the course of this study it became clear that most directly constructional adaptations in social evolution owed their origin to the simple powers of reaction natural to protoplasm and human aggregates of protoplasm, it seemed that here was more than a hint of a general law. It suggested something to fill the great and acknowledged gap in variation. For such reactions and forced changes might well be the main source of cumulative variations in animals as well as those in social organisms. That zoologists were even yet at loggerheads on the methods

of inheritance tended to encourage this belief, for where such extreme division existed any solution seemed possible. Although the particular conclusion reached may be of little direct interest to politicians, evidence that the same law works in animal evolution as in lower-grade social aggregates should afford sociologists generally strong additional evidence of this constructional evolution. They should therefore neglect statements that a theory of this kind can have no foundation. For there are many eminent zoologists and biologists who disagree with their more rigid brethren. Palaeontologists, forced to rely on morphology and morphogeny and therefore less liable than other specialists to be distracted by the phenomena, almost universally favour the theory of functional inheritance. They refuse to divide for ever ontology from phylogeny. I shall say no more of orthodox theory than that its extraordinary complexity is unlikely to favour its prolonged life. In zoology simplicity of structure is the only guarantee of longevity and lasting theories must not outrage the very nature of explanation which is always simplification. There are tribunals to appeal to which have been consistently ignored. The biologist with an adequate knowledge of anatomy and pathology is hard to find. It is to anatomy and pathology I propose now to appeal.

THE INTERNAL ORGANS. It is a common complaint by palaeontologists that biologists pay little attention to the 'hard parts' of their subjects. This is certainly true of their bones. But it is even more remarkable that no biologist has ever appealed to the internal organs and viscera to support his own arguments or to controvert those of his opponents. None of the great zoologists seem to have been aware that an animal had internal organs. This remarkable fact, due no doubt to their addiction to taxonomy or immediate classification by external marks, led me to think that an analysis of the variational construction found in mammals might lead to a combination of Darwin and Lamarck with stress, breakdown,

and repair. Evolution on these lines was a continuously morbid or borderland process in which reparatory and compensatory variations enabled organisms to carry on generation after generation. Had these men possessed modern knowledge of the ductless glands and the known possibility of inherited changes in them there would have been machinery at hand for explaining hereditary changes, and the inertia of initiated changes of which something must be said later.

A GENERAL LAW. Though more on the point may be superfluous there is much evidence that the suggested law of repair is of universal application. A vast bulk of political and historical testimony suggests that in the social conception alone lies the heart of the mystery which so impressed Burke. Disaster may be the parent of new institutions. In every art and craft of man, in architecture, engineering, and law itself, the theory held. It remained to prove it for the animal body in spite of the antagonism of orthodox biologists. The strength of their position lies largely in the absurd convention among men of science that it is bad manners for the specialists in one science to contradict those in another on their own ground. There are great numbers of palaeontologists, physiologists, pathologists, and embryologists who disagree with dominant biology, but in practice or in public are inhibited from saying so.

VIRCHOW AND VARIATION. It was after doing work on this aspect of variation that I learnt so great a pathologist and thinker as Virchow had suggested that changes from the type of parent organism must be the result of pathological accident. Few appear to have taken the slightest notice of this. Judging from the way in which pathologists have generally been treated it seems repugnant to biologists to imagine that disease had, or could have, any morphogenic influence on evolution. It therefore seemed an original conclusion, if any biological notion can be considered such, when

I formulated the view that an injury was a variation and a variation an injury as disturbing settled function, and that disease (dis-ease) and disorder leading to variation as the result of stressed functioning were, if repaired, the prelude to further variations. Thus organs were continuously being modified. The anatomical evidence of this proved so clear that the actual mechanism of transmission became secondary and relatively unimportant. When in a campaign the river reported as impassable is found to have been crossed the time has gone by for demonstrating that none can cross it.

DISADVANTAGEOUS VARIATIONS. If the above is correct the Darwinian view that disadvantageous variations would instantly be wiped out must be wrong. For life is always overstressed and life for the individual or the species is getting the better of obstacles inside or outside the organism. Thus the true theory of living structure is that its growth is neither casual nor foreseen but the continuous opportunism of the organism as working parts and as a whole. In whatever desperate circumstances it does its best and mends and builds again. It is clear that the main difficulties as to the source of variation have gone if it can be shown that these variational principles definitely apply to so much as a single organ. They can be shown in action in the embryonic and evolutionary development of the mammalian heart, the stomach, the uterus and placenta, and the profoundly significant descent of the male testes.

I have argued in *Warfare in the Human Body* that biologists have not taken full advantage of their sources of information in embryology and general pathology with its vast field of natural experiment, and shall not here enlarge on the subject. The greatest difficulties of descent do not apply to social organisms. But if the theory here suggested enables the student to flatter himself that his own career may have a favourable influence on the cerebral make-up of his descendants, he can be assured that such changes are not necessarily moral or even

intellectual improvements. At the best they are but reactions enabling the new organism to carry on and there is irrefragable evidence at hand to show the evolutionary progression in strength and capacity may be accompanied by gross moral deterioration. And conversely it is known, as Hughlings Jackson saw, that the hypertrophied intellect may destroy human courage and virility.

EVOLUTION A MORBID PROCESS. However we regard the view that in reaction repair lies the potentiality of most constructive variations in the complex animal body, it certainly emerges that evolution is essentially a morbid process whether in the body or a nation. In the following chapter I propose to deal with factors which tend to the stability of the unstable and plastic State organism and are obviously parallel with similar factors in the animal body. But before leaving the present subject we may with advantage remark again the actual agents which do the work. They are live tissues and cells using tools and weapons such as enzymes, under the influence of hormones and bio-chemical agents which by their pattern enforce more or less definite results. This is no place to speak at length of such processes, but sociologists should not fail to observe that they are carried out by social agents acting for social ends automatically suggested to them by increasing stresses. Just so there are stresses and emergencies in societies which are met, by no means so easily or well, by the efforts of massed or classed units acting under tradition or directions which emanate from structures in which living units function. It is unlikely that these analogies will easily permit it to be affirmed that both kinds of organism were not moulded by past function.

CHAPTER VI

SOCIAL AND SOMATIC STATUS

MAINE ON STATUS. After dealing with the forces making for variation it is no abrupt transition to turn to factors of stability. In that respect there is no single word devoid of irrelevant political prejudice which is so important as status. In spite of all written on it few have appreciated its value in the mechanics and physics of the State organism which is necessarily and etymologically its creature. I shall not deal with what has been said of it, except to note Maine's well-known aphorism that the movement of progressive societies is from status to contract. How far that is true or false on biological lines will emerge when the nature and meaning of progress is considered. The sociologist should be able to determine to his own satisfaction, if not to that of others, whether status with a limit on freedom, or contract as a loosening of status, tends most to progress. For on the social organic theory progress appears to be ascertaining and settling status. Caste is crystallized status.

CASTE. For when we consider it, we see at once that caste, as a natural and normal settling process when the social organism is working quietly and easily, is the very opposite movement to that suggested by Maine. Instead of status moving towards individual liberty and conscious contract, 'progress' in this light is the move towards inherited enforced behaviour. This may end in the instinctive acceptance of conditions far more binding in social practice than contract. Contract in this light is seen not as a real movement towards some theoretic liberty but as an actual reminder of the power

of the State to limit liberty. It is a subject proper to historians to inquire into what seems to have been a continuous approach to and recession from more or less rigid status to conditions resembling individual contract. But we may note here that mass liberty of contract is a fiction which may incline the historian to listen to the sociologist, if not to the biologist himself. For though contract cannot be translated into biological language the social organic relations of status may help to solve many historical problems. As a social term implying more or less settled situation and function in differentiated parts of any organism it may be used in all biological sciences without strain. It can be employed not only of man and all other animals but of their organs and cells. For embryonic growth implies the settlement of status and the assignment of function, though it should be noted by politicians that there may be in the embryo very radical adjustments which no doubt are revolutionary to the tissues concerned. These aspects of status as general phenomena in evolution have not been treated by sociologists. It is not strange that none seem to have seen that the tendencies they note in human society are the result of those found in any organizing protoplasm. For even among biologists of a certain type there is a marked reluctance to admit that the inevitable adjustments of differentiating protoplasm are not only the raw material of adaptation but adaptation itself. Perhaps students may be asked not to assume on authority that massed organic units are specifically and specially endowed with a new faculty. Such notions need to be firmly discarded in this analysis or status will assume a psychological mantle and cease to be intelligible in pure science. It may be taken that whatever protoplasm may be it settles naturally as protoplasm the basal physical laws of nature.

PERMANENT OR SEMI-PERMANENT STRUCTURES. As a steady factor in structure evolved for relative permanence

status is clearly of the highest importance. We see that its phenomena may be deduced from the laws of inertia themselves. The best known dictum of Bagehot, who attempted with little real success to introduce natural selection and some suggestions of physics into politics, is that for organization there must be 'a cake of custom.' This is largely afforded by the way social units cling to status so long as they can function easily. A society must not be too plastic and its potential tendencies to delinquency are largely restrained by status. But looked at in the light of the phenomena discussed in the previous chapters it is seen at once that any semi-permanent structure is always being stressed to breakdown. Status, therefore, is at its best a brake and at its worst a dangerous obstruction. It is a physiological, sociological, and biological fact that disease and disorder arise in the cells, tissues, organs, and classes in which status has lost all plasticity: in those where it has been subject to abnormal disturbance: and in those in which no strength of, or pride in, status has been reached. It is the task of politicians to settle status in a working social pattern and those who consider organization without prejudice may well turn to caste systems as possible guides.

EASE OF FUNCTION AND STATUS. It is easy to transmute physiological status by simple conversion into ease of function. It may seem absurd to attribute love of security, ample nutrition, and social recognition to protoplasmic tissues and cells. Yet a psychological absurdity may be a physiological fact. All the passions of protoplasm are found in all protoplasmic constructions. I cannot refrain from thus emphasizing this great common factor of status. Not all biologists are content to see their unsettled problems disposed of by the illicit introduction of 'mentalism.' By what has been said of the 'passions' of protoplasm I have indicated a salient weakness in Spencer's physiology. For I have purposely attributed 'feeling' to protoplasm in all its forms, not as he did merely

to humanity. The irritability, or excitability, of the cell, or of the minutest possible portion of protoplasm, is a *sine qua non* of its existence and powers of reaction, and the sole source of feeling and life in all animals.

CASTE SYSTEMS AND STATUS. Something might here be said of social physics, since the relation of status, growth, and development to physical factors such as momentum, inertia, and gravitation will at once suggest itself. Any such analysis, however slight, could but accentuate the importance of status in whatever form it exerts energy. But we may consider it now in direct relation to the actual building of animal and social organisms. I shall approach this on lines which enable us to get valuable help from Keith, who has considered a subject likely to excite passion with a singularly detached mind. But it is hard to agree with him when he says that the animal body represents a slave state, and that none therefore would care to copy nature closely in a social system. For this is a psychological way of regarding such phenomena. To speak of slavery brings in illicitly the problems, or pseudo-problems, of 'free-will' and liberty which a logical system must avoid in dealing with physical and mechanico-physical problems. So far Keith seems to agree in a measure with Spencer. But it is now notorious that some social writers have no objection to a rigid caste system. They even go so far as to think it may easily be reached, or imposed by force. Of such visionaries in the biological world it is needless to treat. They may construct a rigidly ordered State for definite purposes, perhaps to passing advantage. But the essence of caste status is ease and content in normal inherited function. It is illogical and irrelevant to object on theoretic grounds of liberty to what can only come about when an automatic and instinctive system of castes has been evolved. To act under the conditioned reflexes of instinct cannot be called slavery, if we are not prepared to call the building of a bird's nest

slavery. It must, however, be owned that the mere notion of castes appears to excite remarkable and interesting reactions in certain classes of politicians and sociologists, who seem unable to view calmly what can scarcely come into existence till they have been dust for a million years. But sociologists at least should remember how the idea of such a system affected the man who did most to suggest it. His repulsion to it destroyed Spencer as a logical thinker. It is pleasant to know that it has not affected Keith, who can face what none may like with complete equanimity.

THE SOMATIC CASTE SYSTEM. One not unnatural objection to considering the caste system is that it is not 'practical politics' and that in any case the length of time needed to build it relieves sociologists of the necessity to study anything of the kind. Fortunately biologists are not wholly confined to practical politics. They may ignore sociology as a means of enlightenment but their studies in the animal body cannot allow them to forget caste, however they may phrase it. The evolution of the bodily caste system is by no means complete and therefore has been, is, and will continue to be, a semi-morbid process. But we may at least reflect that the greater number of our own somatic cells 'enjoy their life,' doing the work that comes to them in their order. The essence of an ideal caste system is one in which none are in revolt. Physiology contemplates the conception with more calm than pathology can show. Hippocrates wrote that in the body 'all things assuredly work together according to their whole nature and in each its parts take part in the work.' This work is voluntary if the parts can do no other. With real sympathy of social parts there is no reason why an outcaste sweeper with his broom might not be as happy as any Brahmin with all his caste marks and thread, and relatively as much endowed with 'liberty.' It appears liberty is not a biological word. There can be no freer worker than the

automatic worker. This is the somatic freedom hereditary caste cells get in the body. It is hard to conceive a settled attached tissue cell 'wanting' to be a different cell. The relatively free cells capable of various terminal destinies obey the somatic call, even to immediate death, with an astonishing alacrity. In this respect there could be nothing more suitable for the study of sociologists and politicians than the bone cells or osteoblasts which lead a wonderfully active social life, continually laying down, taking away, and altering bone as they shape it to meet stress. When on fatal occasions they get undue and unnatural liberty there may be sarcoma, such as femoral sarcoma, an explosive malignant osteomegaly, or overgrowth. I shall show that such accidents may affect the social organism itself. If an accident frees bone cells from their natural limiting membrane the periosteum, they may go adrift and build bone where it is harmful. With little difficulty we can conceive them regretting their freedom. The normal life of the osteoblasts is no more and no less slavery than that of a living community doing its best. The tender-minded philosopher may, perhaps, turn to a caste system in hope rather than fear.

CASTE SATISFACTION. This push of the somatic cells to remain in what may be called the order of their instincts or tropisms comes out with remarkable clearness when we find that the errant dispersed cells of a cancer or sarcoma do their best to build up structures and colonies like those in which they lived before being driven out by the breakdown of environmental control. Of the social analogies of cancer I shall have to speak later. These tendencies of cells to continue as they grow can be illustrated by many social analogies. All those who have inherited or acquired caste marks or caste signs and shibboleths are exceedingly indisposed to abolish them. Those who have attained a new status make efforts, not unintelligible or ridiculous on this interpretation, to ac-

quire appropriate caste marks, habits, and the appearance of customs. And every politician of aristocratic faith is an advocate of the caste to which he belongs or would belong. None of our potential castes are, however, rigid and definitely hereditary. Even the royal castes of Europe have surrendered to outcaste marriages owing to social stresses. All sociologists must have observed such de-differentiations in times of stress. From the point of organic materialism and the organic caste State these de-differentiations are obviously a retrograde step. If this leads to the conclusion that democratic 'progress' is retrogression it can no more be helped than it can be denied that such retrogression may be temporarily necessary. For we see quite clearly that the continued differentiation needed for an easily and economically working caste system requires long periods of quiet development for which the world must wait. The disorders of advance or regression on any political theory are bound to continue, whether the masses of social units choose one or the other interpretation of advance. But in spite of all disorder the tendency to caste is constant. Whatever is thought of such a movement it is just as well to observe how evolution works and not to decry or lament it. From the point of economic working and sound organization it scarcely needs demonstration that socialism to ensure better distribution of energy and the doctrine of the organic state cannot be said to be opposed in a biological sense. That both systems are tyrannies *in posse* cannot be doubted. It may seem absurd to say that the equalitarian and totalitarian states may not in the end be distinguishable, but those who have observed the struggle for power and the effect of power on its possessors will be the last to contest the conclusion.

CONSERVATISM OF LOW CASTES. If I am right in thinking that social units inclined now to the democratic ideal of an imaginary freedom would find themselves regulated with severity on either plan, it should console them to observe the

notion of settled hereditary caste is by no means alien from the human social being. For one man desirous of higher caste marks or signs of social superiority, millions care for no more than they have, provided they are sure of keeping it. This is a great conservative or static factor. Nevertheless those who are dissatisfied and desire a higher status, not as the poorer classes do, when dissatisfied with their nutrition, but because they seek for power, may bring about political results. Disappointed politicians frequently desert their colleagues in the hope that increased political status will compensate for what is said of them. Thus with the rise or fall of a party there are otherwise unaccountable conversions. Given changing conditions a Labour politician may find in another party power, position, and a pension. A disappointed Conservative may console himself with the Hegelian principle of the Identity of Opposites, or the conclusions I drew in the last paragraph, and seek the other camp by night. I do not impute blame to those who experience these triumphs or calamities, as they seek satisfaction for their instincts. For this is the real end desirable in all caste systems and schemes of hereditary status. On the whole it seems satisfactory to observe that the vast majority of those in a low status would be highly reluctant to change it. They might not be so ready to resist or condemn the highly organized State as is often thought. For it offers all a period of peace, rest, and ordered work before disease, disaster, and the external environment strike down the State and painful reorganization begins anew.

INCHOATE CASTE SYSTEMS. The word 'caste' is used so loosely that at one moment it means mere class distaste and at the next the rigidest divisions in India. Indeed all gradations can be found. It is more advanced in Europe than most think. In the highly differentiated classes, with a tendency to inherited occupation, are soldiers, seamen, the bureaucratic element, doctors, actors, and the clergy. We use the word to

imply a definite or an inchoate fission between those of recognized status based on power, possessions, knowledge, and particular pride in some direction. This last resembles what is known in India as *swadharma*. It is scarcely an insult there to accuse a Brahmin lawyer of being a coward, or a warrior of want of brains. Phenomena of this order are characteristic of advancing or differentiating civilizations and can be seen in all classes, even, or it might be said specially, among criminals who have great class pride. The number of sub-classes in England below the lower middle-class is beyond easy reckoning. At times these inchoate 'castes' exist among men who do not greatly tend to differentiate socially but whose wives are separated by a comparatively wide gulf. I am not acquainted with work done in this curious section of sociology and have to rely mainly on my observations which have been very wide. It may be said here that I have almost entirely refrained from any deep study of the mass sociological work printed during the last thirty years. As I had approached these subjects from the physiological and pathological side it did not seem necessary to consider work that ignored biology. In the study of caste and social status I was forced to rely greatly on my own experiences among more than twenty races of men, and among classes difficult to enumerate. It seemed to me that status raised the key questions to the problems of social, political, and even international policy.

ENGLISH CASTE ORGANISMS. It may have been noticed that in the preceding section I used the phrase 'all advancing or differentiating civilizations.' However disagreeable this may seem to political advocates of de-differentiation I think the only sound way of estimating advance, whether we call it progress or not, is by differentiation and easy working. This may be thought a sociological assumption, but it is a biological fact. For the biologist will approve de-differentiation only when regression is necessary and forced in order to

introduce such repair as is needed for further differentiated growth. Those observers in England of the breakdown of the old land system, commonly called *squirearchies*, who have lamented its decadence and decay, have rarely, if ever, shown any appreciation of the fact that, taking a given estate thus ruled and ordered, they were face to face with the phenomenon of a Spencerian social organism at work. In all good specimens of this organism were to be seen every mark of inchoate and even advanced caste with definite hereditary tendencies from the squire himself down to the last herd-boy. They worked successfully without those concerned recognizing in them protophases of a well-organized dictator State. Maine recognized in the Manorial group the essence and protophase of organic feudalism.

STATES AND SOCIAL HOSTILITY. Many will ask why they should concern themselves with the minuter variations of status. They find it hard to believe that problems familiar to themselves and their wives are strict analogues of grave social questions. But their own subdued hostilities, continually the subject of personal and social politics, should show them how important unsettled status must always be. For till it is settled there will be open hostility and even on a reasonable temporary settlement the residual hostility among nations, or mere families in a suburb, still necessitates the higher diplomacy. When it is a question of classes and sub-classes and castes in the act of differentiation, there will be a struggle for nutrition, power, and place, or, in sum, for status in the working of the rude social organic machinery. On a fresh disturbance there will be new conflict, probably on economic grounds. For social tissues fight for economic nutrition areas. In the animal body if there is an erosion where squamous and columnar epithelium meet they fight each other for the blood and lymph supplies. In the social hostilities of the body in which temporary tissue and endocrine

balance exists there is still a struggle for dominance. The body as we know it is still an unstable organism. The endocrines govern construction and metabolism but each by itself will destroy the body by hastening, slowing, or diverting action. They work by their excretions, commonly called secretions, and balance or immunize each other. This struggle of balancing immunity is a main factor in what is called metabolism, the conduct and economy of the body. There is basal hostility in the conflict of these glands, in the classes and sub-classes of the tissues. Is there nothing analogous in the social organism? None can deny that all the classes are essentially jealous, fearful, at times provocative and even purposely offensive to each other. Their fear is for their status. To preserve the endocrine balance of societies is the task of the police and of statesmen and an accepted status of classes is the best means by which it can be attained. But without hereditary castes there will be a continual resurgence of hostility. The social peace of the idealist is an unphysiological conception. Fear and dread may be more essential for peace than amiable qualities. As physiologists we may indulge the dream that the glands and tissues 'love' each other. As pathologists and biologists we know much better. We, and our tissues, live in a relative state of immunization which may easily break down, and if it does it will be found that what was sought and fought for may be best summarized as status. But immunization will be treated at length in a later section.

RANK IN SOCIAL AND NATIONAL STATUS. As regards its political side the subject of status is practically inexhaustible. That status can lose its disturbing side only when castes are finally clear-cut and hereditary is indicated even for nations by the organic theory. I do not propose to undertake the task of the anthropologist, but politicians might find it useful to reflect in a museum on the bones and weapons of their

predecessors and their status in vanished ages. The great importance I attach to the political aspect of recognized status is due to the simple observation that here we have the key to temporary and perhaps prolonged international peace. For the real balance of power suggested so strongly by animal organization can only come with the definite recognition and ranking of national status and caste. Of this I shall have to treat later and merely remark now that such orderly physiological differentiation of nations in a conceivable world organism would not necessarily rank them as equal. The power of status lies in the fact that it practically abolishes a sense of inferiority. We may note that bodily health and normal functioning may depend on what might seem negligible to a green student of anatomy. The parathyroids are tiny glands but their failure means tetany and their extirpation death. A lesser nation may enjoy pride of status in closely organized functioning although among an aristocracy of power.

CASTE, PRIDE, AND RULE. This study of status should result in something like a proof that aristocracies, or aristocratic oligarchies, are likely to be the natural result of social, national, and international differentiation when it is carried out on organic principles to its logical conclusion. But no one need imagine that this can occur within what the politician would reckon historic time. The theory, however, may afford the ardent aristocrat in politics ground for continuing hope in face of the numberless setbacks his ideal will meet with before his class, or some similar evolutionary growth, can rule in peace over settled and contented inferiors divided into castes, each proud of its status and organic duties. Though the prospect be far it may be consolatory to dream that his actual, mental, or political descendants will be the nerves, ganglia, and brain of a commonwealth of the world. For history itself, brief as it is in the career of humanity, may be called to support such a physiological theory. Even in the few years of which

written evidence exists there have been isolated nations far more advanced than to the mere verge of such systems. There was Peru. The Spaniards among the wreck they wrought in America destroyed the first evolutionary living proof that a real organic state is possible. Many such evolutionary experiments must have met with failure, either by hostile impact, or, more frequently perhaps, by the failure of ruling classes, too conscious of their own status, to recognize the deep social instincts they drove into revolt. It is not absurd to speak of status in its recognition of place and allocation of duty and honour as an instinct. For status many will bear starvation. For it many will die. It goes far deeper than humanity. It is not absurd to see it as potential in protoplasm. For it pervades the humbler animal world. The working evolutionist and field naturalist can be called to witness to this instinct for recognized place and precedence in the very wilderness. The milkmaid sees it in the outraged dignity of the herd's customary leader to the milking yard when she horns a conscienceless rival for daring to pass her. Those acquainted with horses and dogs may easily find like cases. In man, and especially in woman, this instinct, when reinforced and apparently rationalized, can be even stronger than in the lower animals.

BRAIN AND ITS OVERGROWTH. If this trend to organization is finally to lead to lasting higher caste rule, there will be in the ruling class a better understanding and sympathy for this instinct in the regulated classes than can often be found now in action. The unmodified instinct for power leads to revolutionary social disorder. In the animal body the power of the brain to order and direct is modified by the glands and glandular instincts. Those solely directed by the brain are apt to find themselves in the same institution as those who have none. In history, and we may infer in pre-history also, there have been continual disasters brought about by those in

authority ignoring instincts which over-dominated themselves. There are somatic analogies if we look on the brain as a partially authoritative committee of ruling cells, which, by the very nature of growth inertia, seek to enlarge their scope. Hughlings Jackson lamented the only too likely increase and undue dominance of the brain over the animal and vegetative body. He foresaw in this the breakdown and destruction of the race. It is curious that he anticipated the sombre conclusions of palaeontologists for whom all races rise, culminate, decay, and vanish. We may remember that the over-action of any gland, even if it is not malignant, may destroy a race. There is no race salvation in great brains, or the men of Neanderthal and Boskop might have survived. Many races whose few remaining skulls inspire respect and wonder must have perished before rivals with less reason, sharper arrows, and the greater instinctive cohesion which the argumentative intellect destroys. I say so much to stress the fact that organization is always a dangerous process and that the assessment and balance of status must be of vital importance. For to understand it is to approach the understanding of politics.

HEALTH AS BALANCED STATUS. In the animal body status has been more or less settled by millions of experiments during millions of years. These secular experiments are very roughly summarized in embryonic development. The inference that the phenomena discussed are the embryonic reactions of social organisms at a very low grade of development is irresistible. We can also infer that these organisms will suffer from disorders, analogous with somatic disorders but less likely to bring about fatal disaster and death. For low-grade organisms can suffer injuries and mutilations or bear operations of which high grades would die. But even low grades may perish of atrophy or unbalanced hypertrophies and are easily distorted into monsters. So in the body with pituitary overgrowth we may have gigantism if the patient is young, acro-

megaly or overgrowth of continuously exercised points of the body, such as the hands, feet, and jaws, if he is old. In societies there are overgrowths and aberrant neoplasms which may be harmful, as will be demonstrated later. In the meantime I propose to political students the task of finding such social and political analogies. They will need some little knowledge of pathology, but nothing should be more instructive to those who wish to see the social organism work easily than to mark how the body with its advanced development can fail. The student may observe myxoedema, the result of an atrophied or disordered thyroid. The patient becomes coarse and heavy in feature and heavy in wit, without liveliness, sparkle, or power of quick response. Hypothyroidism has slackened the work of all the tissues and has lowered the pride and status of the cells. It should not be too difficult to find in social organisms local examples and suggestive analogies of such thyroïdal failure. There have been examples in the case-books of history of a race losing the lively metabolism, strength of status, and readiness of action, needed for its preservation. Myxoedema can be cured, but a failing race will be hard to help. We know little of how one gland activates, stimulates, or inhibits others, and it may be even hard to discover why the whole government and bureaucracy of a social organism may let it drift into national myxoedema. It is known that nerves actually administer stimulating and steadying drugs at their end-plates in muscle. Some such action is at the basis of all growth and continuance and it may equally be at the root of failure and national death.

CHAPTER VII

SOCIAL ENERGETICS

STATUS AND ENERGY. Many of the difficulties which may occur to students with regard to status can be resolved by mere inspection of its working in themselves, their families, and the neighbourhood in which they live. These form an admirable frame of reference when society itself with all its complications is in question. But if we begin to inquire into social energetics, and ask what is the source of social energy exhibited in public life, it is by no means easy to say how we can relate these phenomena and status itself to physics. And yet it seems necessary to do so if we are to understand the meaning of politics, the functions of politicians, and how it is they come to acquire and exert energy. What, indeed, is it that moves politicians to build and unbuild the social engine just as osteoplasts or bone cells build and unbuild bone? Perhaps an answer may be suggested if we take the phrase 'a social engine' and analyse it briefly. For then we have at once no more to do with 'energy' as a mystery but can regard it as measured by work done. The conception of an engine may thus link up on energy lines the work of the social and the animal body alike. But it is more useful to regard an engine as like the body than a body as like an engine. To say the latter is to learn nothing, but the conception of an organic body as a complex of more or less specialized engines or machines may well be used at once of the social system. For such a system is developing a set of living structures composed of living units functioning in their status and order to do special and general work. This may be held at once to class it bio-

logically. In biology we may assuredly look on any specialized organ as a quasi-organism by itself. Any gland may be thus regarded. In lower-grade organisms we may often separate parts which will function as wholes and even become a complete animal. In politics it is easy to look on each party or party machine as a living organism, while both parties, or many, with their effective mechanism of a secretariat or nucleus, are living and working parts of the national organ, a parliament. That again is an important organ of the national organism. All these parts are plastic, fluent, and liable to disorder, disease, and death, or to repair and continuance as they seek to command and use social energy in a ceaseless struggle for power. There can be few more vivid illustrations of the validity of the conception of society itself as a living organism than thus to see the basal principles of evolution in the living machinery of government.

ORIGIN OF SOCIAL ENERGY. Although we may avoid the greatest difficulty connected with energy, its ultimate origin, the politician must at times ask whence comes the immediate energy with which he deals, and of which he is indeed a major or minor channel. How do the social masses work together in such a way as to exert political and ordered energy as distinguished from that which is anarchic and disordered? Here we undoubtedly come on one of Burke's political mysteries as soon as the crude conception of a social contract is put aside. Certainly there is no contract, nor can we conceive a mere general agreement affording power for the 'State,' in whatever primitive form, to use in control. Control lies in the nature of the mass itself. I do not suppose it will command the assent of sociologists, who for the most part ignore the difficulty, if it is said that the source of energy lies in the nature of organization and its actual origin in status. For there can be no organization without subordination, and the first sign of subordination is recognition of place and function which we

call status. If, however, it is asked how status collects, directs, and controls energy, the answer must be that status *is* organization, and those who are interested in the 'passage to physics' may well begin to ask themselves whether there are not social massed forces analogous to molecular action. I shall not carry this inquiry far. But we know that in the animal body muscular strength is the massed action of billions of cells exhibiting in unison the phenomena of osmosis and surface tension. It is very remarkable that we should be able to refer muscular energy to water, which has the greatest surface tension of any liquid. It would be hard to name another capable of its functions in the animal body, though Bayliss has suggested ammonia might have taken its place. It is not difficult to imagine that the contractile energy of billions of muscle cells, controlled and directed in their sarcolemma, or covering, should do the work of the body. They have to work in unison by way of contraction and expansion, a more accurate word than relaxation if we are to explain all the phenomena.

STATUS AND SOCIAL ENERGY. Is it then possible to say, without straining an analogy to a mere metaphor, that the status relations of groups are a source of social energy? If it is held that complex inhibitions preventing action in certain directions are a 'source' or means of collecting and directing energy and that these inhibitions and tensions with their complex pushes and pulls resemble the forces of status, I do not see why social status should not legitimately be looked on as analogous to surface tension. And it might then be regarded under the possible heading of social molecular physics. I am content to leave the suggestion, merely remarking that we must finally make a choice between such a solution and dismissing social energy as one of Burke's mysteries. Perhaps a parliamentary physicist may carry this inquiry further when he observes more curiously the powerful surface

tension of party and the peculiar phenomena of a party in dissolution.

POLITICS AS STRESS. If we have to put aside for the moment so difficult a subject as political physics, we may now observe the more ordinary political and parliamentary phenomena with better hope of understanding them biologically. Whether we think of the stresses of political life as connected with surface tension or not, there can be no question that biological tension and stresses can be seen in that life very clearly indeed. Whether most politicians approve of being looked on as protoplasmic units struggling to function among forced biological trends and pulls and pushes, I cannot say. I imagine that the leaders of parties or sections of parties will have little objection to such phrases when they observe these trends exemplified as narrow semi-instinctive forces in those single-minded politicians who give them the most trouble to manage. The average politician contemplating these phenomena is bound to grasp enough of the principles of organization to see that political 'hostility' works in structures founded on status and discipline, which control, direct, or inhibit energy, and he should have no difficulty in discovering that the principles of organization are extraordinarily alike in a machine, an engine, a party, an army, and finally in the social organism, even if he fails to see them at work in man himself. He may finally learn to see that his own party shows the peculiar phenomena of a living organism. If he is remarkably intelligent he will infer that from its conduct, behaviour, and fate much might be learnt of the processes of evolution, and something of the nature of energy. For parties are born, bred, live, and grow and break down: they repair themselves well or ill: they again continue or are ousted from the more immediate sources of energy. These are the functions and fate of organisms, even of organs by themselves in a low-grade animal such as a simple social 'animal.'

LEADERS IN POLITICS. It must have been noted that little has been said so far of intelligence in the social organism. This is commonly supposed to play a very great part in social evolution. But no sound biologist will think so. There is nothing of which biology can take cognizance which can be called intelligence as the word is commonly understood. This I hope to discuss at length in a later chapter and have merely mentioned it here as an introduction to a subject of much political misunderstanding. Why is it that leading politicians are rarely, if ever, those in their party reckoned by common assent the most highly endowed cerebrally? The solution of this apparent anomaly is not far to seek, for all groups are mostly moved by instinct and therefore by that very instinct dread cleverness, which pretends to supersede historic tribal instinct. That outside critics should be surprised to see the ablest intellectually thus set aside is comprehensible, but the phenomena would seem less remarkable if they remembered that the party or committee, which finally agreed on the leader in question, was regulated in action as a group, or quasi-organism, of much lower intelligence than its constituent members. Those who have considered crowds, with or without le Bon's assistance, will not overestimate the collective intelligence of a group, a curious point in considering groups devoted to moral, intellectual, or religious movements. I do not therefore imagine arguments of this order will be received with patience except by isolated students. Yet it is certain that the more experienced politician, with or without brains, will feel assured that group choice is a better political expedient than selection by intellectual examination. Certainly experience tends to show that the clever politician is a danger to himself and a weakness to his party, since he is likely to lead them logically into situations where logic and instinct part company. It matters nothing that events may prove him to have been right if his enterprise failed for lack of instinctive support. To be

deserted in the midst of a brilliant design is no uncommon experience in politics and war. For brilliance is in itself a rare and abnormal variation, to be admired in camp but distrusted in the field. The general instinct which distrusts it is biologically sound.

MILL'S MIDDLE PRINCIPLES. Much more may be said of the scientific aspect of parties, parliaments, and leaders which tends irresistibly to class all the phenomena as biological and determined finally by the laws of energetics. I am well aware that it is commonly stated by those whose prejudices and prepossessions incline them to believe what they say, that a mechanico-physical philosophy has now no standing ground. This is easy to assert, but it will be much less easy to prove that in their experimental work the advocates of this semi-meta-physical view actually desert the micrometer and balance. In sociology it is unfortunately easy, by the illicit introduction of psychology, to get away from mere observed behaviour. Thus Herbert Spencer, in spite of the pseudo-science he acquired (I say pseudo-science as that imparted to him by assistants), went on to build a semi-psychological individualist sociology without any real reference to the sciences lying between physics and a doctrine of social aggregates. Such a reference was desired by John Stuart Mill when he sought, or suggested, 'middle principles' in sociology. To offer them is obviously the purpose of this treatise, which has already demonstrated that we need more of biology and of physics than Spencer attempted to supply. But perhaps no individualist of his order, however brilliant, could observe social movements purely on the biological plane without intense uneasiness for the 'supra-organic' system he so ardently desired. A greater proof of the danger in scientific work of desiring a particular conclusion, without reaching it legitimately, cannot easily be found in scientific history. Perhaps better acquaintance with those practising politicians, who have perceived the frequent

tactical necessity of diverting social energy in order to preserve what they esteemed valuable, might have helped Spencer to consider the pure physics of society with greater attention. For such statesmen must often have thought of social explosions in terms of crude energetics, though few have referred to their action with the open cynicism of the politician who recommended circuses as a palliative for agricultural unrest. So direct a reference to physics, however crudely clad, would certainly not have been one of Mill's middle principles, but it might easily have led Mill to discover them in biology.

OUTLETS FOR SOCIAL ENERGY. Keith in an interesting passage remarks on sport as a great social safety-valve for energy which might otherwise prove dangerous. A crowd exhausted by the excitement of an important football match will not easily turn to the common continental and very dangerous amusement of wrecking a hated embassy. All such diversions are truly diversions of energy and can be classed as examples of the mechanism of physics. Though it is the theoretic function of parliaments and other forms of government to control energy when destructive or over-constructive, a common phase of social inertia, they rarely do so effectively and by their failure demonstrate their dependence on physical forces, which run beyond their control. For the political and social energy they do not control, satisfy, or collect runs into the construction of side and competitive institutions, such as unions among workers which bid for power to do what parliaments have failed to accomplish, whether by set political purpose or mere laches. That such unions, open or secret, again fail to 'collect' available energy is obvious, for they in their turn are troubled by syndicalists and other extreme groups using energy unsatisfied by unions. It should be clear that all social disorder may be reckoned up in terms of unsatisfied political energy. For till it is satisfied the instincts of status are unsatisfied. These phenomena demonstrate of them-

selves how energy alters, determines, breaks down, and rebuilds on definite lines of stress and repair all social organs and institutions, just as it determines the functions and organs of animals. And it declares the functions of politicians as the tools of instinctive social energy. Thus it is their collective instincts rather than their intellectual qualifications which are really valuable. There is nothing in this crude analysis to defend the extreme views of the State, favoured by dictators, which tend not only to crush what political intelligence there may be but to crush social instincts. Dictatorship may be a measure of extreme political danger or a perilous attempt to make by force what can only grow with safety. As a rule the dictator comes into existence when parliaments grow senile and fail in co-ordinated energy, even as the heart in arrhythmia may fall into the disorder known as fibrillation.

SYNTHESIS AND SPENCER. To what extent the above considerations may give politicians cause for reflection or satisfaction is hard to say, but it seems that they tend to discredit the synthetic social organism of Spencer when he proceeds directly from crude physics to individualistic social construction on lines which in fact ignore biology and the laws of growth. They should not depress the average politician, or even the member of Parliament, whose main duty is to preserve his local party in health. To do this he must conform to biological principles as a sub-leader and definite organ for collecting and directing political energy. What free energy he has after doing this he will no doubt place at the disposal of his leader.

CHAPTER VIII

TOOLS AND WEAPONS OF PROTOPLASM

BASIS OF STRUGGLE. After the preceding chapters in which an attempt was made to simplify the phenomena of status and even those of social energetics, the student should now see more clearly the complex forces tending to unity and to disruption. They come out as hostilities between parts. They are not 'vice' or disorder, but essential to relative independence as well as to combined structure. The cellular and personal phenomena repeat themselves more loosely in the social organism, in the fundamental antagonism of all institutions competing for social energy. For this struggle turns almost entirely on the fight for nutrition, however nutrition is measured. It is by its 'greed' or appetite for energy that any part or whole manages to survive. Keeble has remarked on the nitrogen hunger of sea animals. But this is the basal factor of life and of all struggle in sea or land.

CELL TOOLS AND WEAPONS. If this universal struggle for superiority or equality, or at the least a secure place of contributive function, is then essential to constructive life, it is necessary to inquire how it is carried on. It will be found that every cell, in itself an immense historic community, is furnished with what I have elsewhere called cell tools and weapons, which are not only connected with its powers of reproduction, the heredity of the animal to which it belongs, but determine its own life processes of nutrition, waste, local repair, and defence. It is impossible to think of protoplasm as not thus armed with metals and non-metals. Warm-blooded animals use iron in haemoglobin and Crustacea copper

in haemocyanin. Other metals such as manganese, and non-metals such as magnesium, calcium, and iodine, are but part of this inorganic equipment. The cell's life work and its defence are ensured by enzymes to build up and to break down, by catalysts and electrolytes to speed action, and by manufactured products such as the acids and its other powerful operative secretions and excretions. When we admire the cell's vast activities in its semi-permeable membrane as a fortress, and at the same time as physiologists recognize its dangers and ultimate fate, there can be little hesitation in thinking of it as a city armed. To use such language suggests at once an endless series of analogies. Here it is sufficient to see clearly that the use of tools and powerful destructive inorganic weapons of defence is no emergent privilege of man, but an inheritance from primal protoplasm.

FALSE ANALOGIES. If the theory of the social organism has hitherto failed to establish itself as reasonable such a failure is largely due to weak, and even absurd, analogies, for many of which Spencer must be held responsible. Thus there can be no true analogy between nerves and telegraph wires, or between veins and roads, for if the basis of any analogy lies in the likeness of function, its strength lies in an approximation to an homology, that is, to likeness in the basal material of the organs compared. I do not think this is generally acknowledged or properly understood. I am not concerned to criticize Spencer, but much of his weakness, apart from his refusal to carry his theories to their logical end, must be held to lie in his not seeing clearly that the social organism must be compared not with a mammalian, but with a low-grade invertebrate. Nervous action is no doubt accompanied by electric phenomena, but its rate of transmission in man is barely five hundred feet a second. It may more legitimately be compared with a fired fuse, or even to a chain of bonfires. There could surely be no more empty comparison than that of coins to blood

corpuscles. But after what has been said there can be no need to seek support in such analogies. True ones must strike very forcibly the observer with a microscope. He will turn away from irrelevant resemblances and learn to concentrate his attention on those in which the habits, customs, and tropisms of protoplasm are clearly displayed. After proving to his own satisfaction that none need divide man from other animals as a tool user, he will see all alike as communities of cells employing weapons, and by an easy transition will recognize that the same materials are used for definitely similar purposes of life and defence by the great social organism itself. Thus it seems that a physiologist of a philosophic temper may reduce all cell-communities, however great, to a common denominator, not merely in method but in matter, and thus homologize their nature and function. It begins to look as if such a philosopher might find no insuperable difficulty in identifying the tools of fighting protoplasm with the extreme weapons of modern war. That the sociologist or politician, who has not considered his science or practice in relation with the biological sciences, may have much difficulty in coming to that conclusion I do not for a moment doubt. And yet if the student thinks of protoplasm as naked to begin with and yet presently, or after geologic ages, emerging armed with the capacities and means he can easily observe, it should not be beyond him to perceive its successful progress was actually due to war. This early plasm picked up weapons by the way, tried them, used or discarded them, perhaps almost perished of them, but with them was in the end victorious, and carried on its evolutionary life. And if this life was nourished as it is now by the deglutition of other protoplasm and protoplasmic products, it grew by war and even by cannibalism. I do not see why it should be considered an over-hasty transformation of the equation implied when it is said that the same phenomena are to be seen in the lowliest early protoplasm moving blindly without so much as

a membrane and in the grouped differentiated masses we call social organisms or nations. They too move blindly as they lay hold of one inorganic factor of evolution after another, knowing, as we are bound to believe, as little of their real future as the theoretic primal protoplast itself. It is not hard to infer that, whatever that future may be, these will still depend on the tools and weapons of the environment in which they find themselves at the time to preserve their status and independence.

FURTHER ANALOGIES. Arguments of this kind are undoubtedly dangerous since the unimaginitive are in the great majority, but with a little courage they may be carried further. If what is true of a cell is true of a social organism on its particular plane we must admit their common use of the inorganic is rigidly analogous. They both employ it to facilitate the work which continually increases so long as there is free energy to employ. If so, then buildings, mainly of calcium in its various forms, may be reckoned the 'bone' of a social organism. This bone is analogous to the test of a protozoon or better still to the strengthening spicules of a sponge. The removal of all such material in functional form would at once reduce the social organism to a mass of de-differentiated units even as the dissolution of calcium structures would denude all shell or test builders of their houses and forts. The city which has suffered an extreme earthquake is in like case. It seems then that the use of tools of all kinds held to distinguish man turns out to afford an irresistible argument for the common classing of all organisms. An insuperable obstacle thus becomes a proof. And if any further proof is needed that the use of tools of this order is a common mark of all protoplasm it may be found in the fact that the tools of insects are the more perfect prototypes of the tools made by man. There are few, indeed, at which a mechanical engineer or skilled tool-maker might not marvel. We find

that our inventions, or what we have 'come upon,' were come upon by those to whose history that of the warm-blooded animals is as yesterday. Protoplasm has not merely invented tools but in doing so has initiated processes governing life to-day in all its manifestations. When in its early adventures it grasped the inorganic and thus made what must have been a huge and perilous obstacle into a pivot of victory, it cannot be seriously denied that in that act we may find the ultimate origin of property and all possession, thus accounting for the tenacity with which these are held as tools of nutrition and defence. Perhaps this may be commended to the profession who are apt to think the laws of property as they know them of immemorial antiquity.

TOOLS AND ENDOCRINES. I have already suggested that the sub-governmental departments of the State organism may reasonably be likened to the endocrine organs or ductless glands of the animal body. Naturally such a department and its important units as a functioning organ may find this hard to grasp, unless they learn to think of an endocrine organ as a regulator and distributor of energy acting on traditional lines as they do, and thus determining social machinery, even actual manufacture. The departmental heads of a national treasury might recognize themselves as a massed analogue of the pituitary gland, a great controller and regulator of energy. For this small gland, hidden under the brain in the pituitary fossa, governs construction quantitatively and qualitatively and exercises a powerful influence on the other endocrines. We may take as a further example less rigidly organized 'glands' such as a war office or admiralty, both imperfectly adapted organs directly influenced by the environment but themselves actual employers of inorganic materials such as those that can be found in single cells whose ancestors mobilized them many million years ago. Such organs with weapons must exist in any organism, great or small, if it is to have a chance of sur-

vival. However we define nutrition its basis is the consumption of protoplasm and protoplasmic products by protoplasm, and nations as hungry social organisms in a zoologic field will 'eat' those without adequate defence. I do not, however, class the fighting departments as endocrines. They are more direct and primitive in their functions. Those who accept cells as already great molecular communities will have little difficulty in conceiving the least of them with inchoate and experimental departments. As these fighting organs represent the means by which national organisms have contrived, and still contrive, to continue they must necessarily excite the interest and curiosity of the politician or sociologist or even outside student, whom the apparently more humdrum functions of an office regulating home affairs might leave comparatively indifferent. For they will at once perceive that though official negligence may produce domestic disorder, such as strikes and even local mutinies of the police, there is usually time to deal with such social states, while the neglect of their functions by defence organs may easily lead to irremediable national disaster or even to national extinction. Of the causes which bring about departmental atrophy or dystrophy and the decay of nations I hope to treat later. Here, however, the really pertinent point is the universality of internal and external struggle, with each organism, and all its parts, armed to defend or increase its status. With these conditions of the social zoological field there comes a state of tension, more or less rhythmic in its nature, which is liable to break down but in fairly normal world conditions is continually repaired. I have no hesitation in pointing out that the law of stress, breakdown, and repair applies here as elsewhere. It is physical as well as physiological. We see that these phenomena are in every sense as natural as any physical phenomenon with which we are acquainted.

PHYSICS AND HOSTILE SYMBIOSIS. It would, however,

serve no useful purpose to explore beyond the dimly lighted territory of armed or helpless protoplasm and penetrate into the even darker regions of bio-chemistry and physics for further evidence that hostile symbiosis is a physical law of nature. Taking this for granted I shall turn at once to the external environment and the relations between social organisms which a few sociologists believe to point to their final fusion as a world organism. On the lines laid down this is obviously a theoretic possibility, but before assessing its value it is clearly necessary to discuss the phenomena of open hostility which we call 'war.' I shall inquire in what way, if indeed in any, it can be distinguished from the conflicts so far dealt with, even as an acute stage. There seems to be sincere opinion which holds war to be 'unbiological,' whatever that phrase may mean and whatever the fighting power of those who, like the merest cell, take up arms to defend it.

CHAPTER IX

BIOLOGY AND WAR

PREJUDICE AND WAR. It may be infringing on the privilege proper to a preface if I repeat here that the only possible way of avoiding prejudice when dealing with acute disorders among social organisms is to keep the discussion strictly on the biological level. We have therefore nothing to do with the finer hopes and aspirations of humanity or with pity, indignation, and rage at its sufferings. It is not for the surgeon to shed tears on the operating table or for the physician and statesman to weep by the bedside of nations. I have therefore endeavoured, not without difficulty, to deny myself of set purpose the use of contemporary writings and historical examples liable to excite passion. It is essential for the student of whatever order to keep his poise in so difficult a task as that which is here proposed for him, and it will therefore be best to allow him at his leisure to find examples for himself. This attitude obviously inhibits using work which appeals directly to the passions, even the best passions, of humanity, with which I may be in direct contradiction. But in the following sections those who cannot regard particular arguments with entire equanimity, should find nothing peculiarly shocking unless they have wholly resigned reason for sentiment and refuse even to inquire into the nature of war as an evolutionary factor.

WAR AND EVOLUTION. Most politicians, who live in a hardening atmosphere, will not ask much proof that war is such a factor in the survival of nations. For they themselves live and survive by conflict and by it perish and are forgotten.

They will probably be little inclined to split straws over the point that it tends, or may tend, to the elimination of the higher types and the actual survival of the more brutal. There is assuredly no scientific guarantee that a successful type may not be distinctly lower in intellectual and moral faculty than the type it ousts. But young students not yet tempered by experience and reason who may be tempted, and continually are tempted, to listen to what William James called tender-minded philosophers, should be warned against taking the view that anything not warranted by approved authority to better a race morally is unbiological. There is, indeed, even reason to believe that an admirable scheme of morals may easily be elaborated which in practice must ensure national extinction. There can be no place for prejudice, morals, religion, or intellectually concocted schemes of idealism in this argument so long as it is kept on the purely biological level. All psychological aspects of late thought are irrelevant. We are not inquiring here what a number of estimable men admitted by popular acclaim as privy counsellors to the nation have to say of war, however interesting their opinions may be. The argument has to deal with massed undistinguished units and with nations as social organisms of an invertebrate order at a very early stage of evolution, without an achieved brain or nervous system, which seek in a continental zoologic field the urgent and immediate means of nutrition, defence, and dominance. Looked at in this way they present a pure zoologic problem, but, as I have already pointed out, it is at times legitimate and useful to regard them as potential parts of a great amorphous single organism endeavouring blindly to organize itself into a working whole of merely sub-hostile symbiotic parts. The problem would then appear to be one in invertebrate embryology. In either case the question is whether bitter conflict, whether or not we call it war, serves an evolutionary function.

HISTORY, PRE-HISTORY, AND WAR. If against all evidence

it is contended that the function of war biologically is not to produce and perpetuate a fighting aggregation or facultative race of allied groups, it should be easy to deduce the contrary from what we know of pre-history. But anthropology is despised by historians, ignored by politicians, and little regarded by sociologists, some of whom can scarcely bear to think of the early origins of their tentative science. I am aware that one school of pre-historians holds the view that war is a late incident in the life of man. How far this is supported by the continuous elaboration of flint implements it is hard to say, but there is much evidence that war combined with cannibalism, and probably war for cannibalism, existed in Europe over vast periods of time, even as it exists now in parts of the world. It is more than likely that Neanderthal man, who occupied Europe for perhaps 50,000 years, was ousted, and not improbably consumed, by our own ancestors who replaced him. I do not, however, propose to elaborate the argument, but it may be as well to remind those who deny the function of war that its general biological result has after all been to bring about types of social units who do not torture their enemies as a matter of pleasurable routine and eat them afterwards. Even if we have no guarantee whatever that evolution necessarily produces finer succeeding types and much evidence that the best almost inevitably are destroyed, it seems that what improvement we have is in fact a biological result. But I am more concerned with the interesting and practically certain conclusion that war so far as our knowledge goes has been continuous, and that where actual knowledge fails perfectly legitimate inference from the evidence refers its beginnings to times in which implements found beneath the Norfolk crag were being fashioned a million years ago. There is no need here to discuss when it will cease, but there seems no reason to doubt that in certain conditions there may be grateful repetitions of the peace of Augustus and the Antonines under

a conquering dictator. Whether such a biological result is better than arrangements reached under cover of reason and ratified by treaties is a matter which I hope to deal with later with as much detachment as the subject requires and very rarely obtains.

PEACE AS ARMISTICE. Before going on to discuss some possible somatic analogies in embryology for the like processes among the great social embryos, it seems possible to throw some light on 'war' of all kinds by considering its ideal opposite 'peace.' No one who has read so far with patience will for an instant imagine that such a word is more than a figure of speech to indicate a condition of tolerance between parts. That this tolerance is often, perhaps usually, suspicious and even sullen is what might be expected. I shall in a later chapter treat both tolerance and immunity at some length. Here it is sufficient to note the facts. It is not travelling beyond phenomena to regard such tolerance as exists in the international field as merely affording opportunity to preserve conditions favourable to preparation for conflict. There is no deep-seated organic belief that in the end conflict can be avoided. It can even be said that this conflict, however subdued, is always in action. The historian and the physiologist may be at one in thinking that there is no peace between nations, except between two or more allied against a third. It is notorious to politicians that even in this case the subdued hostility of the allies is rarely cancelled, but tends to accumulate and explode at the termination of the alliance. Or, more disastrously, even before it. For these reasons it seems to follow that what is called peace by politicians and international social life by biologists, may be biologically no more than an armistice.

ABSORPTION IN THE ANIMAL BODY. If war is looked on in this way, though merely as an argument, to require bloodshed as a *sine qua non* for war is greatly to narrow a useful

definition. A prolonged political struggle which ends in the inevitable absorption of some autonomous enclave, by tradition a social organic unit, against its general 'will' or instincts, may legitimately be looked on as an act of war, even if the surrender is forced by purely political and economic weapons. It makes it no less war to note that very similar phenomena can be seen in embryonic development. The social organism which absorbs the lesser unit to its own satisfaction at removing a danger or obstacle, may defend its action on the principle of natural selection. In the animal body an active semi-autonomous organ may play a part in general development and be completely wiped out of existence. This can be found in the highly developed human body. Physiologists cannot assign very definite functions to the thymus gland, though its tissue resembles that of the tonsils. It reaches its full activity in the third or fourth year and continues to exist only so long as the body is in active growth. It shrivels when maturity is fully reached and only a mere relic is left, possibly without function. There is reason for believing that this passing organ might have remained as a powerfully functioning endocrine gland greatly delaying sexual maturity. As it persists in castrated animals and begins to atrophy with the onset of puberty it may be postulated that the hostile activity of the growing gonads influences it adversely and finally destroys it. If it should persist in *status lymphaticus* there remains a tendency to feminism and some dangerous instability, especially in anaesthesia. Many highly developed working parts are utterly destroyed in the embryonic struggle. They may be absorbed or newly directed and rebuilt as new variations, the character of which, as in the various developments of the Wolffian duct, depends on the influence of the male or female gonads. The relevant point here is that in all organic development there is little prospect of survival, even for an established organ, other than that offered by its capacity to function and defend itself. Nor

does history afford good examples in which distinct social organisms have been able to survive for any other reason, except in cases where their more powerful continental congeners have found the existence of the lesser state a greater aid against still more powerful rivals than it would have proved as a possession.

SOCIAL ABSORPTION PHENOMENA. Phenomena analogous to the disappearance of the thymus and the diverted functions of other organs can easily be found in social organisms. Groups of functioning officials are displaced and often starved or atrophied as an act of political and economic war in growing towns and cities. The struggle is often an occult one in which what is known as 'corruption' is the motive. Here again is seen the struggle for sources of nutrition. There can be few better fields than cities for the investigation of social phenomena on evolutionary lines since the conflicts are marked by the essential ruthlessness of organic war. The sociologist who takes a city for his province may not unreasonably look forward to biological discovery. He will usually find every analogue to savage warfare. Thus he might observe social phenomena remarkably resembling those of 'organizers' seen in experimental embryology, where monstrosities may arise from transplants and implants, and from this recognize the difficulties of hasty and inconsiderate 'planning' when it interferes with normal growth processes. In any case he will see that a planned 'organizer' to do work in the parts disintegrated and re-integrated must first be a disorganizer. These processes are minor revolutions with all the characteristics of social war. I cannot say how far it will interest social students to learn that 'organizers,' in their proper place or as transplants, probably do their work by their tools and weapons, that is by their biochemical constitution, not necessarily as living cells. The disturbing and destructive side of such organizers seems not to have been stressed in the remarkable work done in experimental embryology, nor has any one sought analogues

in sociology, where they are surely easy to find. It may be leaving out some easily found logical links to say that all this work shows the danger and difficulty of using reason recklessly in international affairs. This should emerge more clearly when we consider planned attempts at permanent peace.

'PEACE' IN THE ANIMAL BODY. The conception of continued peace among social organisms, of whatever grade, is often supported by arguments based on the peace in which the cells of the animal body are supposed to live. Few physiologists will accept this view without immense qualifications. From what has already been said on the subject it must be evident that this peace is but the varying balance of tensions which we are scarcely yet in a position to appreciate. If the argument leads to the conclusion, which many disagree with because they dislike it, that a balance of power is the natural and only fairly permanent way of preserving for periods a reasonably static state of organic health, I see no possible way of eluding it. It has been shown that anything but a comparatively insecure cellular commensalism is an impossible ideal, a mere physiologist's diagram of an imaginary condition. Those who regard any animal as a perfected symbiotic community, which suggests a world community of pacific social organisms as symbionts, can have but little knowledge of the ruthless processes continuously at work even in an animal body which seems to approach physiological perfection. In a later chapter something will be said of the great defensive apparatus of the body known as the reticulo-endothelial system, the cells of which act not only against actual invading organisms, but clean up, scavenge, and consume the dead and dying. It would be possible by the slightest exercise of the imagination, which in this respect seems unhappily forbidden to most physiologists, to draw a picture of inter-organic life which might well appal the philanthropist. If to contemplate this requires some firmness and hardness of the intellect we need

not be utterly surprised if those who lack such steadying qualities should find it painful to view with scientific calm the necessity a gravely endangered social organism may find to sacrifice its citizens in order to preserve its liberty.

WAR AND REASON. The conclusion of the last note may well lead to one on a subject which excites more discussion than logical agreement. It is often repeated that war is unreasonable, whatever that phrase may mean. It means nothing whatever to a biologist and should mean as little to a sociologist, who regards social life and growth with too much seriousness to indulge in attack or defence of irrelevant theses. To call war unreasonable is just about as justifiable as to call insanity, crime, disease, surgery, and cure unreasonable. A war that saves a nation from partition, subjection, slavery, and physiological insult will seem to most social units or social groups so essentially reasonable as to be instinctive and automatic. It is true that what is thus biologically right and above reason in a race may not be reason for a financier irretrievably interested in submission. What is reason and instinctive reason in a warrior may of course be repugnant to citizens who are naturally, or by disease, without normal courage. There are in any large number of social units probably quite a few who suffer from congenital or acquired adrenal exhaustion and cannot face danger. It is physiologically unjust to call these cowards. But a discussion of that point seems to verge on psychology, and the less the student of biology and pure protoplasm has to do with that the better.

WAR AND GAIN. It is more securely on a biological plane to deal with another statement made about war by many popular advocates of peace. I have dealt with this so far as it is proved false when a nation makes a successful defence. But there is every reason to believe that something is gained when an aggressive and ruthless victor gets what he set out to get, whether it is territory, security, or a mere desire for revenge.

The common argument based on economics has no relevance. The stripped, wounded, and blanched warrior may be faint but rejoicing. That capital is destroyed may be as nothing. A reasonable accumulation of fat in an organism is part of its capital. On stress it can be burnt in needed muscular effort for life or dominance. A victor may lose weight in gaining what he wanted. To say that a great social organism, or the pettiest, gains nothing by preserving its freedom and world status, even at the cost of all its conserved capital, is as false as saying it loses nothing by being conquered. These are platitudes, but it is well to remind sociological students that though nothing has emerged in the argument to disprove them, they are frequently denied.

WAR AND RACE. If the student prefers reason to desirable visions the conclusion must finally be come to that so much can be gained, preserved, or lost by war that it must be regarded as a practically continuous factor in evolution. Conditions known to exist in geologic ages which are to be found all over the world to-day may legitimately be so described. It seems as if it were by war and a degree of isolation after dominance in a given area that races came into existence. These problems have been so well treated by Keith, who has not been diverted from logical analysis by the belief that a golden age can be secured by arrangement, that I am little disposed to discuss them. It should be obvious on casual historic inspection that tribes, nations, and races, like species, genera, families, and orders, come to be what they are by the commonly recognized machinery of evolution. A nation is not difficult to define. It is a politically organized set of people of whatever origin occupying a territory which it would prefer to fight for rather than resign. I do not know a definition of race which is more satisfactory than the denotational one which declares it to be a body of those who possess like physiognomical and physical marks which usually enable alien peoples to

recognize them on sight. It is obvious that the Jews come nearest to being a true race of any people in Europe. It is the possession of these marks, and what appears to be something like an engrained physiological repulsion to extra-tribal peoples, which tends to make them definitely foreign bodies in an alien social organism where the rapid obliteration of differentiation marks is a strong characteristic. The tribal history of the Jews as warriors of which a greatly expurgated account exists in a well-known book is the only partially authentic record which we possess of savage tribes amalgamating and becoming a nation or a race. It is of the highest possible value even in a biological sense. What the ancient 'organizers' of Palestine would have thought of the statement that nothing is ever gained by war is not very difficult to determine.

CHAPTER X

WAR AND BALANCE OF POWER

CONFLICT IN WAR AND DISEASE. After the short consideration given to certain disputable but inarguable points in the last chapter we may turn again to ask in what way the conception of a social organism helps us to understand the constantly recurring conflicts characterizing all we know of history in books or the bones and barrows of extinct species of mankind. The organic conception certainly refers the student directly to physiology. It should convince him that the study of sociology without the help of the sciences dealing directly with the living body must be speculative and barren. It is this knowledge only which can help those who have been taught to look on disease as unnatural, a view too often held by men who should know better. For the physiologist, largely accustomed to regard ideal working as 'natural,' has given some innocent and receptive pathologists the obstructive notion that disease and the processes of reaction to it are unnatural, because they are abnormal and comparatively uncommon. And this in spite of John Hunter, who perceived clearly that all the phenomena he observed were equally natural to the reacting organism. The opposed doctrine is plainly not far removed from that of the shaman medicine man, who by spells and incantations would expel evil spirits from his patients. It may be safely inferred that what Hunter said of the body he would have said of the State or social organism.

SOCIAL ORGANISMS IN EVOLUTION. If the organic conception did no more than display the various evolving organs, tissues, and institutions of an inchoate 'individual,' however

great or small, struggling to attain conditions internal and environmental which permit it to function as a whole by the regulated functioning of the parts, something must be regarded as gained. The politician of the humblest order will have a clearer view of social disorders and diseases than that permitted to the greatest in an age ignorant of physiological conceptions. If he has an unobscured view of an animal organism as the result of energy exerted in stresses, excitations, and inhibitions and has learnt to see that evolution, even in man, and perhaps in him most swiftly, is even now obviously in progress, and if he has further observed that the major and minor politics of his own country, wherever it may be, are the results of factors scientifically determinable, it seems that he may even grasp the notion of a continent with contiguous loosely interlocked functioning parts as a still greater social organism than his own.

PREJUDICE AND STATUS AMONG NATIONS. Although such a conception will undoubtedly clarify theoretical politics I am not prepared to assert that it will give practical politicians much more comfort than that afforded by a reasonable reply to many political questions. They will for ages be confronted with the problems due to outside interference. But such notions should to a great degree free their minds from prejudice and at the same time help them to understand prejudice better. They may even learn, as Keith suggests, to value it as race-maker and race-preserver and one aspect of status itself. It must be something for the politician to see plainly that what he must have learnt of status among his own constituents applies directly to nations. For this is what the nascent nations or nationalities are struggling for: this is what all nations fear to lose or would regain. The politics of the body are the pattern of the politics of the rest of the world: the physiology of one is the physiology of the other. And so of the diseases and disorders of both, since they may be severe, dangerous, malignant,

and fatal, or may lead at last to repair and perhaps to easier function. I say 'perhaps' because no one can have closely observed processes of repair without recognizing the gross chances of environmental accident.

FEAR THE NORMAL PRESERVER OF STATUS. Considerations of this wide but easily understood physiological order lead naturally to conceptions as to the relations of the parts of a possible tentative organism when over a continental area some kind of order has been reached, no matter how, as in the quieter periods of history. In the *Introduction* it was suggested that since status is of such importance and yet in such continual danger of infringement, there must be some mechanico-physical means of maintaining it for periods apart from the final arbitrament of war. Obviously the easiest way to maintain status is for an organ, or part, to be disagreeable and dangerous to meddle with and for a nation or state to be feared. If an analogue of fear is not to be often found in the animal body when we inspect the powerful reactions of one organ to the excretion, or secretion, of another, I am much mistaken. *In vitro* an active cell with busy protruding pseudopodia may suddenly show signs of terror and lie 'balled up' like a scared hedgehog. But there is a curious notion often put forward that all needed to make the world a warless paradise is to abolish fear. From the physical point of view for which repulsion is as necessary as attraction, it seems as if there would be nothing left to regret. It is said that on a certain famous occasion Porson damned the nature of things: there are not a few who would abolish it. Fear, indeed, appears necessary to order and life itself: it is a strong, even a basal, factor in decent respect for others. If we were to say that every cell is apprehensive of every other cell and every combination of every other combination we should not be far wrong. Fear needs direction and restraint, not abolition. It may be doubted whether in certain ways there is enough of it.

There are disorders which abolish normal nervous reactions. In syringomyelia a man may burn a hand badly and feel no pain. Social organic fear of positive and dangerous encroachment may be lacking. Nations and all social organisms can be blind: they may be stupid and perish of stupidity. If there were universal fear of social world opinion and respect for the claims of ascertained status among nations the task of a nascent centre for regulating world metabolism in the interests of peace, whatever that centre may be held to be, would for a time be comparatively simple. This is idealism. There is nothing against it but all the facts. But nothing said so far can be urged against a league of nations as the dimly possible protophase of a powerful organ, except that organs must grow. They cannot be made.

UNEQUAL INERTIA OF GROWTH. The greatest evolutionary difficulty in the way of continued regulation is the inevitable tendency of parts to grow unequally. That there is an inertia of growth in varied metabolic gradients in all animal bodies is well known. And it begins to be recognized, even by the most conventional biologists, that such unequal ratios of growth are responsible for asymmetrical and unbalanced forms finally incapable of surviving. Thus the Irish elk and the sabre-toothed tiger became extinct. This law of unequal growth inertia is probably responsible for the giraffe which cannot become much larger without destructive asymmetry. These phenomena clearly apply in a minor degree to many forms of overgrowth, perhaps not yet dangerous. But the point to insist on here is that there are undoubtedly social metabolic gradients among social organisms. Some slacken their rate, the others increase it, and the peaceful, or comparatively peaceful, stage reached yesterday will be perilous instability to-morrow. These are phenomena the peace advocate would do well to ponder, for his success will never permit him to rest. There is no rest in evolution.

FUNCTIONS OF PEACE LEAGUES. To say so much does not negate efforts for peace, which are just as evolutionary as the results of war and should often slow down, and even inhibit for a time, destructive action. To speak of a peace league protophase is to apply the conception of embryology to a theoretically evolving organic system of states, but it does not mean that it will necessarily develop into an effective organ. There seems little reason to think that a planned league can attain to powerful function in any part of the world. But there may yet be an organic aggregate of social organisms in which a degree of stability has been attained by a common basal metabolic rate and by a regulated increase of population. That such stability will ever be reached by negotiation or reasoning, however cogent, is more than unlikely. It would be a grim prospect if we were compelled to draw up a dated synopsis of the wars likely to precede such desirable stasis. It is better, or at least easier, to look for something which evolution has to offer than to seek for political systems beyond the evolutionary horizon. For, after all, evolution does appear to have something to offer. A detached and even cold-blooded view of war enables us to estimate and put aside the shibboleths of chauvinists and pacifists alike. If we cannot conquer the world, and with equal certainty cannot obtain lasting peace, there is a middle course. If what has been said appears to depreciate reason, even beyond the extent sanctioned by English reliance on instinct merely touched by it, no one should think that it holds no important place in human and animal conduct. For if instinct is crystallized reason that crystal is added to by slow degrees at periods of trial and error and suspended action. The possible errors of instinct at a new juncture of affairs are many. Reason is seen as caution, apprehension, and fear. This is a saving function of fear. It restrains hasty instinctive action and enforces waiting on the event. Reason becomes hesitation dignified. It should serve to check the absurdities

and dangers of chauvinism as well as the actions of those who write prescriptions for peace. The inevitable war of to-morrow may turn out as much a delusion as the belief of those who hold that invasion can be repelled by the waving of olive-branches or a white handkerchief.

BALANCE OF POWER AND CASTES. All that has been said leads to the conclusion that the temporary, and perhaps prolonged, end of inter- or intra-organic strife may be found in balance. This means that so far as the older politicians and diplomatists sought to preserve the balance of power they were on the right physiological tack. As we have seen it is undoubtedly a physiological doctrine. Yet a detached view of war must force us to acknowledge that this organic balance is rarely reached by any other way than the agreement of exhausted powers and principalities. Peace may also be reached by a conqueror with powers of organization. This is an ideal end for nations with an ambitious instinctive thrust towards domination. There are, as we know, historically aggressive races. It is idle, and will remain idle for ages, to state that such a racial purpose is immoral. It is not necessarily a denial of wider State organization. It is one way of getting sufficient power to ensure peace. It matters nothing scientifically if that power is exerted cruelly. The empires of the east, and of Mexico and Peru, preserved relative stability for long periods, long enough in the cases of Peru and India to allow in different eras great developments of classes differentiated into true castes. This appears, perhaps, to have been most complete or general in Peru, which as an isolated empire followed the line of evolutionary differentiation natural to any organization. It was the conception of such a state which so disturbed Herbert Spencer that, losing hold of logic, he also let go of evolution. There can, however, be little doubt that any system of isolated states, undisturbed from the outside, will finally be moulded into a complete system of hereditary castes.

It is not so absurd as some might think to imagine the world as such an organism if, after ages of struggle, a race at last emerged capable of assimilation and co-ordination. It would in such a case be possible to hope for a long period of complete peace.

CASTE SYSTEM AGREEABLE TO MAN. How many stages of war, modified by armistices of the nature described in tentative organic aggregations of our own era, and the more immediate future, will have to pass before such a temporary state of settled order is reached, would be hard indeed to prophesy. There are yet no social organic data. There can be none for ages, since whatever we may think of our own civilization, we have but reached very recently a documentary historical stage. It is, perhaps, only the mind of the calmer anthropologist who can contemplate with equanimity the geologic ages needed to accumulate statistics sufficient for a philosophy of history or that inverse historical method which Comte and Mill looked to with such curious confidence. But apart from these fascinating speculations on the future it seems that even now we can say, in spite of Spencer, that the prospect of a caste system, instead of being disagreeable, seems far more attractive than anything offered us by Utopian idealists or a materialistic idealist such as Karl Marx. It may be necessary to discuss Marx later, though not, perhaps, at great length. On the general analysis proffered here the essential weakness of the equalitarian state in whatever form must be apparent at a glance. Class equality, however defined, is unknown to evolution. I do not, however, postpone consideration of theories of a static state on the ground that they should have no relation to war. Communism is a fighting creed, even if some dialectical materialists seem incautious enough to believe in final stability and peace. It is impossible not to admit in face of the whole problem and the general nature of organic growth that the high differentiation of caste seems the evolutionary solution.

MORALITY AND DANGER. It is inferred, however justly or unjustly, that this state will be reached through every possible form of conflict. And if that is so the morality of ordinary evolutionary processes as we see them is clear enough. Bacon in his *Essay on Empire* says: 'Neither is the opinion of some of the schoolmen to be received that war cannot justly be made but upon a precedent injury or provocation. For there is no question that a just fear of an imminent danger, though there be no blow given, is a lawful cause of a war.' A social organism in danger, or a nation believing itself to be on the verge of realizing its ambition and satisfying its instincts, will find no use for a high morality. Or no more for it than Machiavelli would have allowed. He would obviously have advocated its employment so long as it was likely to be useful, either as a blind or a drug. For on the lines of war, open or occult, it cannot be wrong to delude the enemy, and peace propaganda may be used as an opiate. There can be no doubt that at many junctures of history it has served to facilitate a surprise attack. It is easy to understand that such propaganda may excite suspicion. If incautiously preached the gospel of peace may actually hasten war. For as a tribe no nation believes in it, however much it may, when weak, desire it. It is particularly hard to induce faith in the nationally indigent. We are again face to face with the vital problem of nutrition with which the problems of war are inevitably mingled. But the one essential conclusion to be drawn from the whole of the phenomena is that science offers strong support to the empirical methods of statesmen who seek temporary peace in a balance of power.

CHAPTER XI

POLITICAL, SOCIAL, AND SOMATIC FRONTIERS

PHYSICIANS AND PEACE. It is probable that a philosophical physician capable of applying his art and principles to politics would come to regard the word 'peace' as indicating little more than the fairly quiescent stage of a continued fever. There is, indeed, much to be said for a clinical view of social disorders, a method somewhat less aloof than a merely biological one when it is asked whether remedial measures may avail. Yet most clinical treatment in serious cases does little more than postpone the end. It is true that the social and political physician has small personal experience of the death-bed of civilizations, but when he has once recognized the principles of stress, breakdown, and repair as part of his armament, he will not despair and throw up the sponge with every new febrile crisis. He will, with John Hunter, recognize diseases as natural. It may be said that this is a cynical treatment of world politics by a cold-blooded theorist masquerading as a physician. There is, however, no subject known to me which seems to require such total lack of all emotion. Some will certainly agree that this kind of analysis is more to the purpose than the incompetent quackery of the well-meaning political hedonist, even if others seem to find it shameful that any one should keep his head where steadiness is most needed. Many students must have noted with surprise a class of thinkers, if indeed we may call them such, who display anger when it is suggested that the dangerous trade rivalries of our times are the modern reproduction of savage struggles for hunting or pasture or agricultural areas. It is undoubtedly through the

result of such conflicts for the possession or acquisition of nutritional areas that nationalities are able to live and become strong enough to escape conquest. There are thus the most powerful reasons for defence. And not only for defence but for attack and the entire subjection of a dangerous enemy where defeat means destruction. These are but the natural and normal instincts of a threatened organism, desirous of life. It is, perhaps, only the physician or those who have watched the death of the reluctant and their incredible efforts to live when life is nothing but the residual blind push of protoplasm to survive, who can appreciate the desperate urge of an organic whole to continue, and can therefore speak with the semblance of authority on war as an instrument which may save a country from extinction, or permit it to attain greater power. This is the nature of organic inertia and in all such struggles, whether they issue in success or failure, there can be found many features and forms of action showing analogies not only with pathological states, but with phenomena more simply and clearly seen in physics.

FRONTIERS AND SURFACE TENSION. Thus at the present time observations, made in the investigation of war phenomena, give scientific significance to dangerous frontiers as exhibiting on a large low organic plane some of the characters seen in surface tension. The desired passage to physics from physiology is being made more possible day by day. That physiological phenomena are directly due to factors of a purely chemical kind had been obvious for a long time, but the work on 'organizers,' to which I referred in a preceding chapter, links physiology to chemistry indissolubly. For what has always been looked on as a positively 'vital' process from start to finish is shown by dead 'organizers' to be a pure result of chemical factors. When we add to this the knowledge which shows nervous action, both as regards the vagus or parasympathetic and the sympathetic nervous systems, consists in the

nerve-endings liberating and administering drugs which can be synthesized or isolated in the laboratory, no one need be surprised to find organic phenomena on whatever plane analogous, if not more than analogous, to pure physical phenomena. And if that is so it is scarcely remarkable that surface tension may legitimately be ascribed to frontiers of all kinds, both intra- and extra-organic, in the animal body, in countries, nations, and all the politically connected systems which I have called true organisms.

TROUBLE AT SURFACES AND FRONTIERS. If it were possible for a working embryologist to watch all the intimate phenomena of differentiation and the growth of somatic frontiers between parts as a physician might watch them, he would, it may easily be imagined, find that many disorders, and perhaps malformations, arose at those particular surfaces. I say as a physician, for then he would necessarily be more interested in the failures than in normal regular growths. If it is not extravagant to picture a statesman as a physician, though there are few indeed who go beyond shallow empiricism, it should be of the intensest interest for him to discover that the problems connected with frontiers and lines of demarcation, especially when in process of change, are reasonably capable of being analysed into physical terms which throw light on many grave political difficulties. Although it is unfortunately true that science taken seriously has never been reckoned an essential part of political education, there are some very simple examples that even the simplest politician ought to be able to understand. It should not be beyond any to mark the relevance of capsules and cortices to burning questions of to-day.

FRONTIER SURFACE TENSION. Attention has been directed of late to some new lines of fortification on the continent of Europe. What their actual military value may be I shall not try to determine, but I may say here that shortly after the

termination of the last great war I wrote a short paper which contained an elaborate and wholly imaginary account of new fortifications on the very frontiers in question. The physiologist and embryologist, as well as students of the Protozoa, Mollusca, and Crustacea, will be reminded of an organ or a whole organism building a shell, a cortex, or test for its protection and isolation. The difference between a cortex and a capsule, which is probably not familiar to the average politician, is that a cortex is a reaction structure to prevent alien entry and a capsule one to prevent an imprisoned or surrounded body from escaping or spreading. To build fortifications out of fear of invasion is to construct a local cortex, but if a central country is surrounded by such fortifications built by all its neighbours, these may in their sum be called a capsule. Thus both capsule and cortex have their very definite analogues in international biology. If these are, indeed, simple and almost childish examples of social organic physiology, they yet may lead to others more complex and not so easy to deal with. For there are many frontier phenomena not directly connected with war or an armistice which have great interest for the physiologist as they resemble in a very striking manner physical phenomena with which he is well acquainted. It was to these I referred when speaking earlier of surface tension. If it seems absurd to politicians and sociologists to say that they might learn something from the simpler phenomena of surface tension that lamentable fact cannot be helped. But it may be that if they learnt the way in which water, a liquid with the highest possible surface tension of all, gradually has it lessened by all solutes except certain inorganic salts, they might prick up their ears and attend. It is not necessary to deal here with many of the remarkable and yet unsolved problems connected with surface tension even if I were qualified to attempt such a task. But statesmen might be shown those skilful politicians of a pond,

known commonly as water-boatmen, skating on a comparatively pure liquid and sinking hopelessly in a treacherous solution. Whether considering frontiers and the common conduct of international exchange across them would suggest a problem in natural surface tension it is hard to say. Certainly a few might think of peaceful penetration at a frontier as a dangerous source of weakening in natural protection. It is possible that the admission of many aliens, workers or idlers, may be rightly looked on as a failure of resistance and a proof that the national organism cannot be healthy and socially or politically self-sufficing. It cannot be denied by a biologist that however necessary permeable cellular coverings may be, that permeability is primarily and always limited to defeat the entrance of other organisms than those meant to be consumed. This is the semi-permeable membrane of all cells. It should follow that resistance to the entry of foreigners is instinctive, sound, and rarely to be discouraged. It is perfectly reasonable to look on them as 'solutes.' With dangerous solutes other internal surface problems arise. This is found to be so in physical experiments and it is easy to infer that analogous permeation with undesirable results may take place in labour functions. But these are all too obvious to need elaborate working out. If the student wants a salient example of the problems excited by the breakdown of surface tension among classes, the best to be found is probably that of the negro in and among white populations. The phenomena in such a case throw light on physical problems themselves. I have shown elsewhere that they certainly illuminate anaphylaxis, a very remarkable problem in immunity. This I cannot deal with here, but we may refer once more to race-making as developed by Keith in *Ethnos*. He was quoted earlier as implying that a well-amalgamated and isolated nation might at last create a highly differentiated race. I see no need to follow some modern zoologists and call a race a sub-species,

nor is there any to ask whether such a race is in itself desirable since it is impossible to prevent a fairly homogeneous nation from thinking so. For once given the satisfaction of extreme surface tension its instinctive and physical trend will be towards that goal. I certainly agree that when a certain amount of cohesion with functional ease is attained it seems highly undesirable to disturb national surface tension by the introduction of alien elements which must inevitably lead to further incursions of a related order. That these principles could be illustrated by European examples it would be easy to demonstrate. We can even find countries actually increasing their surface tensions by the ejection of elements which undoubtedly tended to decrease it. Other nations may be seen consistently lessening their tensional resistance to new elements, even to the point of endeavouring to ignore colour. The main point of interest in these cases is that they can be displayed without difficulty as physical phenomena dependent on surface tension and the laws of thermo-dynamics.

FRONTIERS AND SOMATIC DISEASE. Regional frontiers of the permeable order, and since the forced de-differentiation of the Chinese and Japanese we know few of any other kind, present when closely inspected curious analogies with processes in somatic disorders which consist in adult cells gradually de-differentiating and resuming powers of invasion which all cells possess, or may possess, in embryonic life. Thus the comparison of cancerous processes with forms of social disorder is highly instructive. Later it will be demonstrated that there may be in societies processes which can be called malignant without unduly straining scientific language. Without going so far as that we may reasonably argue that alien racial intrusion even without destruction seems to resemble intimately cell and tissue invasions in the mammalian body. I think it might be said that this notion viewed entirely from the medical and pathological side has been of assistance in the study of

cancer itself, since the analogous phenomena in societies are on an enormously enlarged scale. But putting these arguments aside it must at least be admitted that peril may, and indeed must, lie in a loosely defended frontier which is perpetually subjected to peaceful penetration by members of a powerful alien social organism. There can be no doubt that we may compare such immigration and its gross microscopic phenomena with the early microscopic phenomena of cancer. As such a bodily disorder must certainly be preceded by long periods, in which the early phases are but slightly removed from fairly balanced physiological conditions, it has suggested itself to observers that the epithelial cells of the animal body, which are the active invasive element in cancer, are always endeavouring to invade the very tissues which provide them with nutriment. In health and balance, and health is balance, these invaders are repelled, or destroyed if they cross the frontier, by defensive forces of which we have little comprehension, beyond the facts that the excretory products of any tissue seem offensive to other tissues. This defence, though usually sufficient, can be overcome if the invaders are not properly fed. This failure of their commissariat may come about in many ways. The epithelium may be driven onward and inward and into abnormal proliferation by external irritation, or the lymphatic system of the connective tissue may break down of itself, or at least without sustained epithelial attack. May we not say that in these phenomena we see somatic peace or 'health' being ensured for the time by the historically dangerous method of tribute as well as by real defensive powers? If nothing else is learnt by this than that frontiers are always lines and surfaces of special malignant danger in the body we may say that pathologists and physicians have perhaps learnt something from politics, just as the politicians may learn from them. I shall, however, return to this profoundly interesting subject when dealing with internal social

disorders in a national unit. In such an organism there are analogues of frontiers, and since it is on a higher plane than a potential continental organism the likeness found in it to malignancy may be of a close order.

FRONTIERS AND ENCAPSULATION. The whole argument leads to the conclusion that if autonomy is not to be continually endangered the less permeable frontiers are the better. It would have been better in the end for states which break down barriers and by so doing loose forces beyond their control, if the political aphorism 'let sleeping dogs lie' had been applied to the Far East. But in any case even peaceful penetration is often a short cut to war. A murdered missionary may capture a new colony from those who should never have allowed him to enter. This clearly applies to aliens of all kinds if homogeneity is a political end. It is impossible to deny the disagreeable fact when we see that the most continuously recurring social disorders over large areas of the world are due to the presence of aliens. In large numbers they almost always give rise to grave febrile reactions which, if the loss of blood is a grave sign of inflammation, may well be called such. In the past phenomena of this kind led to Jews being forced to live in ghettos, a form of social encapsulation essentially similar to structures built by the animal body when it has to deal with foreign bodies which it cannot expel. A fact of political value in this connection is that a great cause of the irritation they bring about is one they cannot help and indeed may well be proud of. In a western world of mixed and evolving nationalities and nations the Hebrews are, for their grief and glory, neither one nor the other but the only real race west of Constantinople. Thus they are more than commonly alien among less marked and differentiated peoples who regard their isolation as insolence. Those who have no frontiers but tolerance and the gates of an actual or social ghetto are too liable to suffer the pains and penalties of the homeless intruder.

But I shall speak further of this race when we come to deal with immunity and toleration.

NATURAL AND INTERNAL FRONTIERS. A national organism's internal frontiers such as the boundaries of its administration areas need no elaborate comment. Phenomena similar to those dealt with can be seen everywhere. However these divisions came into existence they must be preserved jealously or they will presently be infringed upon by the very same instincts and prejudices which make national instinct and patriotism such fiercely conservative passions. We may often mark the role of local 'patriotism' and pride, perhaps in the ancient borders of the parish. From these affections arise local institutions and organs which it may be well to cherish as they tend to promote co-ordination. The curious student pondering over parochial records may well learn from them, too, the very laws of evolution. They might even convince the incredulous that evolution is not a special doctrine for men of science to amuse themselves with, but that it rules construction everywhere and can throw light on the commonest homely domestic problems as much as on the gravest enigmas and disasters of kingdoms.

CHAPTER XII

INTERNATIONALISM

PRINCIPLES AND PRACTICE. All workers, when they have reached a rule of thumb or 'common-sense' way of doing, can be shown to have touched the basis of a general principle. Great principles are arrived at by trial and error, not by the gigantic intellect man attributes to rare examples of his species. Empiricism and cumulative experience are indeed forms of induction and must in the end disclose general laws. Certainly statesmen have to live by the logic of practice, not the logic of the schools. They are, perhaps, the most likely to recognize that logic is but the skeleton of the way things happen. Thus it cannot be denied that continuous resort to a particular political method must have a national logical foundation.

BALANCE AND LOGIC. This seems so obvious that it might make the most simple historian ashamed to mention it, were it not that the one natural method of postponing the action of hostile and predatory nations, known as the balance of power, is often denounced by those whose training in biological politics permits them to believe that peaceful internationalism can be established by agreement or perhaps by some heavenly decree. Such a rash denegation of the value of experience is the more lamentable as the instinct at the back of it is valid, since internationalism at its best, without complete racial fusing, can be nothing but the balance proper to a set of states so well organized as to be practically a single organism. It is impossible to find a trustworthy statesman capable of believing such

a solution easy to reach, though there are many ardent students of politics ready to offer him an admirably logical scheme of action to assure it at once. There may also be many blue prints of engines for perpetual motion. These critics are often a great and unnecessary affliction to men of power and action. This is the more to be regretted since such advisers are frequently people of fairly considerable intellect, who might do useful work if properly directed. It may be that the blundering persistence of those who know everything is after all a biological factor. For the determined set against a temporary balance of power in favour of a magically produced eternal one shows signs of producing a reaction. It may even induce nations to observe at last that balance of power is a general law of all construction and that the one possible way to inter-organic unity is to recognize that half a political loaf, or even a slice of it, is better than no bread. For every organic process must begin somewhere.

IDEALISM MAY HAVE A BASIS. In studies of this order the possibility of our discovering that the wildest conceptions of the idealist may have a biological basis, is of peculiar interest. This does not mean that they are now, or soon, likely to be practicable. What it does seem to mean is that the human brain is incapable when normally healthy of conceiving anything wholly devoid of reason. This may seem properly outside biological discussion, but the slightest study of the insane themselves will demonstrate that even madness has logic in it. I do not mean to impute praise or blame, with which the biologist has nothing, and the historian little, to do, but merely to make it clear that in some cases even wild idealism may well represent a biological trend. Internationalism worked out in grouped nations and nationalities as a working organism is not a foolish conception if it is understood that such a regulated symbiosis must take biologic time. It does not follow even then that any particular group

of partially allied nations that we know now will reach this result. Biologists, and even more certainly palaeontologists, would be reluctant to pin their faith on any group in existence or likely to exist for geologic ages. If this puts idealistic internationalism in its true place among possible evolutionary ends, it does at least declare it a possibility. It is implicit in the theoretic notion of a world organism. This may not placate the respectable social groups who cannot see in the balance of power policy an adumbration of what they desire, or even that which we may call its rudimentary biochemical skeleton. Yet these prophets *in vacuo* are not merely the victims of a scientific illusion, for no tendencies found in considerable numbers of social units can be wholly without an instinctive organic base. They represent here the physical forces making for cohesion and aggregation just as the opposed phenomena making for segregation and separation represent fundamental balancing forces. Even in an attained ideal system of internationalism these energies will be in action and must ultimately work themselves out in new differentiations.

CLASSLESS SOCIETIES. Perhaps this is the place in which something may be said of Marx and dialectical materialism. I shall be very brief, for it is difficult to make a logical bridge between biology on the simpler plane of this essay and metaphysics. The one possible way of doing so would be to demonstrate that Marxian enthusiasts as such represent a biological trend. I say 'as such,' for I conceive they represent nothing of the kind. What they do represent is the perfectly natural tendency of protoplasmic units of all kinds to revolt under circumstances which baulk the instincts of status and nutrition. It seems to me that no one but a Teutonic philosopher trained in Hegelianism would go to the pains of constructing an elaborate metaphysic to justify this right to revolt. It is, however, possible that Marx's inverted Hegelianism possesses value as propaganda. Not one in ten thousand of

his disciples could define 'dialectical,' but his system has the undeniable advantage of being heir to Hegel's array of metaphysical dogmata in which capital letters are a striking feature. As regards the classless society envisaged by Communists I have nothing whatever to say. The student will appreciate the reasons or he has read so far with little advantage.

ABOLITION OF PHYSICAL LAW. Although I have declined to discuss the political, or mental, problems involved in the demands often put forward for the total abolition of the forces making for differentiation, that is for the abolition of physical laws, it may be as well to exemplify these very briefly. Some examples may give a clue to the forces really making for internationalism or complete organization with more or less central control. We know that as cosmic energy degrades the various metals and non-metals make their appearance. Their disappearance or de-differentiation can be effected only by a reversal of the cosmic process, either generally or in some locally heated space. This is socially paralleled by any great increase of national metabolism in perilous defensive wars where social differentiation tends to diminish and even disappear. Similar phenomena may occur among state organisms greatly differentiated and with conflicting claims. If their continental area is threatened by a powerful outsider, or by one of themselves with dangerous aims and resources, there is likely to be the partial de-differentiation needed for common defence. The shortest way to common action is common fear. Such alliances usually break up, perhaps with a re-enforcement of ordinary pre-war hostility. But they may endure if the threat endures and becomes organic. Such permanent amalgamations with many lasting marks of earlier hostility may be discerned in the two-class, four-class, and eight-class tribes of Australia. Many explanations of these have been given, but none is so sound as that which assigns

outside fear as the one motive which could force cannibals into complete alliance. That the marks of primitive separation existing in totems and marriage customs, with which we are here not concerned, are as plainly visible as the sutures of a skull or the seams of embryological healing, cannot be denied. Without laying great stress on the obvious inference that permanent alliances in a continental area are likely to occur only under the permanent threat of another great organized area, we can see that there is neither historic nor biological evidence for differentiated groups amalgamating on general principles or out of pure affection. Environmental stresses are clearly disclosed as the main causes of alliances, permanent or passing, and war, actual or threatened, is seen again as a powerful biological factor. We have previously discussed the notion that war is unbiological and dismissed it. Forced variations among stressed organisms are obviously evolutionary, even if a lower general type emerges. Evolution knows nothing of higher or lower but only of what will work. In any war victor and vanquished alike will be changed. After a drawn conflict the *status quo ante bellum* is never regained, even if the exhausted combatants are not touched by some predatory *tertius gaudens*. Thus to reduce phenomena, characteristic of an unregulated enthusiasm for early internationalism, by the cold application of facts may be displeasing, but the sooner politicians without practical experience, that is, raw undifferentiated politicians, learn to recognize the materials they have to work with and some of the forces controlling them, which they are apt to think they control, the better it will be for the national organism of which they form a minimum part. To force national friendship is to foment disorder.

PHYSIOLOGY AND BALANCE. It has, however, been admitted that internationalism may at last be reached, even if the goal is far and the way arduous. This can be defended by physical reasoning on the very nature of matter or energy

emerging as mass. And since one purpose of this essay is to show that physical or physico-mechanical forces work in political, animal, and social construction alike by way of ceaseless trial and error and sacrifice without intervening intelligence or any entelechy, some study of a kind of organization intermediate between single wandering cells or mere casual loose groups of cells and the Metazoa should prove suggestive to those who have never considered the social and political life of the Protozoa. In the true animals as Metazoa the various parts, though in a measure autonomous, are physically attached to each other. This anchorage, though not always permanent and secure, necessarily renders anything like independence impossible for the vast majority of cells. It is true that a few billions of the ten thousand billion cells of the human body are free, if indeed their forced tropistic movements can be called freedom. Thus the Metazoa exhibit the phenomena of an attained internationalism, even if they do not always, or for long, display the happier phenomena reckoned on for such a political state of nations by its enthusiastic advocates. Such a metazoal condition for nations might conceivably come about, though it is difficult to imagine any machinery but that of final absorption by a dominant race. The form of living organism very common in very primitive plants suggests a more likely form of internationalism. This is the syncytial form where the protoplasts are not properly cells at all but protoplasmic units with single nuclei without membranes, living in community inside the plant's outer wall. But the most likely forms of life to which we may turn for possible international working groups are the Protozoa, which exist not only as single wandering cells, but in groups. This form of social life may not unreasonably encourage political students who have so far found little to support national symbiotic grouping. For in one great class of the Protozoa evolution has produced another type of semi-autonomous

complex 'individual' or organism. In the colonial Protozoa there is found striking plasticity, even fluency, which gives more play to individual units than that seen in most tissues of the Metazoa, though examination soon shows that each separate unit is controlled, or controllable, by tropisms general to the organized group. It appears to me that this form of life affords much more encouragement to those who like to think internationally than the low syncytial forms, or the elaborate metazoal system. The separate cells or 'nations' in a colonial group still retain a sense of autonomy and individualism. It should be of especial interest to students generally who hitherto have not had their attention drawn to such quasi-organisms to see that in them some cells can change their form, function, and place just as human beings can do in compelling circumstances.

POLITICS AND COLONIAL PROTOZOA. In the *Proterospongia Haeckelii*, which resembles a primitive sponge, there can be seen on the gelatinous surface of the colony cup-shaped flagellate cells, while, in the interior, there are only non-flagellate amoebae. But these non-flagellates are not fixed: they are capable of migrating to the surface, where they soon become cup-shaped and flagellate and take up the functions of those they displaced. These again migrate from the surface and return for a time to the primitive amoeba form. There are innumerable instances of protozoal life which might find analogues in the ruder tribal or mere group-forms of human units. It seems that these 'animals' or 'individuals' have solved for themselves the great social problem of internationalism if we regard all motile amoeba-like cells as autonomous. If it were possible to know in what way these groups, of which the more complex might be likened to a grouped empire-mass of semi-autonomous sub-hostile nations, came to be what they now are it would assuredly be seen that their organized 'civilization' was founded on an early primitive balance of

power in a loose gelatinous 'continent.' I cannot believe that any one will fail to recognize the profoundly instructive analogy which shows any great empire as a political protozoal group. This is a vital resemblance, not a mere illustration. A very short study of the Protozoa will discover numberless illuminating parallels in unicellular amoeboid internationalism where physical and bio-chemical forces are rhythmic and balanced. It should be noted that these systems are rarely for long in absolute balance. We may again remember Bayliss remarking that a system in equilibrium is in fact dead. This very absence of equilibrium is indeed the actual essence of life. To seek profound and lasting peace is to seek death.

'PASSIONS' OF ORGANIC GROUPS. To go further into such questions of organic balance and look for light in physics may seem a hopeless quest. Yet these concerted movements of multicellular unified quasi-organisms, as they change position and function, force us irresistibly to translate such tropisms into the language of physics. We see in them the phenomena of the very bio-chemical action which is the fountain of the passions and prejudices of national organisms in hostile or sub-hostile contact throughout a continental field. I do not know if it will be thought childish, or too abstruse, to picture all human protoplasmic communities with their partial differentiations balanced and aggregated into one vast 'protozoan' community, but in any case the mere conception shows that such physical forces as work with the Protozoa are the very essence of construction everywhere. This basal fact in vital organization demonstrates the deep ground for possible aggregation of a really constructive order, even for an almost infinitely distant internationalism. And in the long meantime, it will serve for the defence of a resort to the balance of power in working politics. To say that all these questions are finally physical may be looked on

as removing them from profitable discussion. But I have said so much merely to acquit internationalisms of being baseless folly and to suggest that those who denounce what they do not understand, in this case the great principle of the balance of power, should at least try to think again.

CHAPTER XIII

INTER-ORGANIC 'MORALITY'

SOCIETY AND MORALS. Science necessarily takes no cognizance of right or wrong except in the functional sense. That which works with the least friction is 'right' and that which does not work easily is 'wrong.' So far as biology is concerned the nearest we can approach to a moral conception is toleration. With living units this is the measure of their capacity to endure each other and to work together. Such phenomena can be translated into the physical terms attraction and repulsion. The absolute minimum of tolerance for organic association is thus measurable by the capacity for common work. This is obviously the *sine qua non* for the associated molecules which we call living matter. Being reluctant to carry these conceptions into the atmosphere of moral argument with which I am in no way concerned I propose to clear the ground by speaking of inter-organic, rather than of international, morals. Most ethical writers have so befogged the whole subject that the very word 'international' seems to imply nations as intelligent individuals. But if we determine at once to view them as low-grade organisms in a biological field it is easy to understand that particular psychological principles or prejudices can have no place in a zoological discussion.

TRIBAL MORALS AS GROUP-GROWTHS. Looking at these questions without prepossessions it needs no argument to show morals as a set of habits, rules, or customs, worked out by trial and error, through which animals of any order are enabled to

live in the comparative safety of tribal or organic associations. Morality thus depends on the stresses which render life in common desirable. The sacrifices of individualism asked in modern times are inconsiderable compared with those demanded of early communities. There is no need to discuss the question whether individualism as we now see it is really pathological as indicating a dangerous want of tribal cohesion. But sacrifices of self are the essence and sanction of the social tendency to resort to communal life under outside stress. No better examples of this fact can be found than those of the exogamous totemic Australian two-, four-, and eight-class tribes previously referred to. From these we may quite reasonably proceed *per saltum* to the tribes and predatory nations of the world as we know it, always bearing in mind the phenomena outlined in the last chapter. I spoke above of the tendency to live 'in community,' purposely avoiding the word 'agreement,' which smacks too much of the imaginary Social Contract which we owe largely to Hobbes and Rousseau. There is, of course, an essential difference in agreements made between subjects and rulers, which are very rare historically, and those forced on whole communities by fear of the environment. Nevertheless these forced permanent welds clearly mean a great advance in social tolerance. How great this is we may measure by our own necessary knowledge of social intolerance as a normal outcome of achieved status. A temporary alliance between tribes or nations may advance this tolerance for a time, and render a closer alliance possible in the future. Any temporary sinking of ancient differences may, indeed, have ethnic and biologic value, for if the stresses of the environment remain or increase there is likely to be a gradual approach to permanent racial or national welding. It seems that every order of social or international morality thus depends on a long necessary association of a peaceful, or at the least, unwarlike type. And I am

unaware of any other means of reaching this result in historically measured time than that found in environmental terror.

TRIBES AND FAMILIES. So long as there was definite hostility between families before tribes proper came into being it seems that there could have been nothing more than familial tolerance, probably of the kind depicted by Atkinson, an anthropologist who worked without moral prepossessions fatal in such studies. But with protective association forced on families there came early tribal tolerance. Bearing in mind such conditions as those found in Australia, where mutually cannibalistic tribes have been welded together, it is impossible to believe that permanent agreement could exist without definite, dangerous, and continuous external stress. I am tempted to quote a common phrase which throws light on these processes: 'Better the devil we know than the devil we don't know.' This is an anthropological truth. Given a larger area with such composite tribes gradually becoming less hostile to each other, owing to similar outside stresses, nationalities and nations must arise. When these tribes have thus become a tentative nation on trial their old inter-tribal customs become part of their intra-national 'morality.' And when other rising nations come into competition with them a new international system must again begin to work itself out. I think we can infer without further delay that international law or morality was not elaborated by a deontologist, dropped from a juristic heaven, or derived from the 'Law of Nature.' It was hammered out on the anvil of war as the result of long-continued hostile and sub-hostile associations of nations. It follows that international law will resemble intra-national morality when external danger has made association absolutely necessary. The only way to make a national organism pay attention to the needs of another is for it to find that neighbour necessary as an ally or a trade area.

Altruism among nations is naturally regarded with grave suspicion.

DENIAL OF CONTRACT. These are doubtless very simple and even childish considerations as far as statesmen and experienced politicians are concerned. But we may still observe those credited with the ability to think who continue to urge particular doctrines on men of action. Many seem to believe that social agreements originate of themselves when it is logically demonstrated, by the manipulation of social and human premises, that peace is better than war. These admirable aphorisms *in vacuo* perish, like anaerobic bacteria, when exposed to the breeze. Without further discussion we may conclude that the only valid agreements are forced agreements which tend to assume a moral status by age, provided they serve a useful function. It is, perhaps, too much to say that a military attack on Switzerland would shock the moral 'sense' of Europe, for the whole of the argument goes to show that Europe has no developed moral sense, but it would excite great alarm in it, the next best thing to moral indignation, as I have shown clearly. A highly organized Oriental horde on the marches of Europe might induce much temporary international charity and tolerance.

A CONTINENT IN CONVALESCENCE. If a war gives rise to phenomena infinitely interesting to politicians and moralists alike, a continent in prolonged convalescence, interrupted by the sequelae common to acute disorders, demonstrates even more clearly than war itself the difficulties preceding an established system of international law. The conditions following on the relaxation of tension with the breakdown of authority, and the lapse into liberty of nationalities previously subordinate, intensify confusion. For such new liberty results at once in conflicts verging on actual hostility due to long-inhibited jealousies and hatreds getting freedom of expression. It is impossible not to parallel such a state of affairs with the

general disorder following on acute fevers, or with the physical phenomena due to the breakdown of a complex molecule with freeing of energy. To hope that a set of loose undetermined rules, without sanction or energy of their own, should restrain these explosive releases of energy is a physical absurdity. Seeing that these rules must finally be defined by the most powerful interested organism it is useless to dignify them with capital letters and call them International Law. No effective scheme has ever yet been suggested for inducing one nation to do justice to another if justice alone called for the surrender of territory or an imagined lowering of status. There is, moreover, none for inducing a nation to refrain from glaring injustice if aggression promises well with no balance of power in action. Accumulating energy in the aggressive must be met by equal physical forces, however compounded, not by irrelevant appeals to emotion or morality. It is unreasonable and certainly unscientific to look in a group of nations, still crudely organized and existing at the best on sub-hostile terms, for the instincts of composite tribes such as the Australian, which have grown together during ages of intra-tribal and extra-tribal stresses. We may as well own at once that morality arises from fear and that without fear and powerful restraint there is no continued order. Though the whole of the factors concerned can be shown to depend ultimately on physical law and the exhibition of energy this denial of morality among nations may affront prejudice. If so, it is well to repeat that in analytic work the appeal is to the more inclusive sciences, not to the more particular ones. Thus, while we must here reject appeal to psychology and to ethical systems, criticisms based on bio-chemistry, pure chemistry, and physics are relevant. In these sciences 'right,' or 'moral,' action is increasingly forced and certain. Whether this necessity or determination is pure or merely statistical I do not feel called on to decide, being assured that statistical determination will serve not only

biology, but all the practical needs of science and politics in general.

POLITICAL MORALS. Whatever some isolated sociologists may think, there are few politicians who do not recognize fear as basal in all social life. It is, indeed, basal in all organic units from a protoplast to an empire, and should be regarded as a deep-seated instinct founded on secular experience. Protoplasm has learnt that the easiest way to avoid trouble is not to seek it quite as clearly as it has learnt that weakness means subjection or death. This instinct for caution is therefore an instinct for peace in the weak. With the strong, predacious, and unsatiated, it is often mere political wisdom waiting for ripe occasion. Diplomats know better than to believe each other without the corroboration of facts or the sanction of obvious interests, and treaties last as long as they serve political advantage. Spinoza avers that all commonwealths have the right to break contracts when the motive of fear or hope is removed. What statesmen say has often little relevance to what they think in private or in conclave. At the best it is evidence of what they wish to believe, and any statesman acting on such a ground is a national danger. There is nothing remarkable in these phenomena: they can be paralleled and illustrated in physics, bio-chemistry, physiology, and embryology where work is done on the purest political principles. Again we see national organisms as predatory animals of a low grade, for the most part attached to the soil, but capable and desirous of moving and capturing the proper ecological territory of weaker national organisms. This tendency increases with increasing power and population. Nothing but force can restrain it. Yet with permanent, or comparatively permanent, restraint there arises the proto-phase of an evolutionary balance, whether that seen in an animal organism or in the looser groups of the colonial protozoa.

HUMAN ECOLOGY. It would pose the bravest professed bio-chemist, embryologist, and physiologist in one to give the barest skeleton diagram of the reactions taking place during embryonic growth before any two tissues or organs reach the rhythmic balance characteristic of full normal function. But such an authority could assure us that billions of experiments must have failed before balance became possible. There is no escape from the conclusion that similar processes must precede organic balance among national organisms grouped in forced working contiguity. No man has written with authority on the ecology of nations, but a scientifically trained historian, not ignorant of palaeontology, might lead to an intelligent interpretation of the functions and reactions of grouped nations in council by the camp-fire or in a palace, and thereby render less dangerous the notion that agreements can last or that any nation can endure long whatever its success in council or the field. The danger in treaties and agreements, which are little more than paper, lies in the fact that national organisms tend to believe what they desire to believe. They may lay down arms and awake in chains. Eternal and active 'vigilance' is the price of health in the organs of the animal body and it is the price of free action for a national organism. Statesmen will not interpret 'eternal' loosely. They will recognize that to organize a continent may be no more than a prelude to meeting other organized invaders. Nevertheless none need be inhibited from looking on the passing or semi-permanent councils with which they are acquainted as conceivably viable embryonic forms of a working organ for regulating or delaying inter-organic hostilities. They may possibly prove to have great temporary value, if it is understood that the nascent or dormant instinct for peace when traded on by short-sighted politicians and philanthropists may excite more wars than it can compose. For national organisms at war always mistake their instincts for righteous impulses which

render outside interference of the mildest kind an insult. Thus rash and misplaced moral action conceived on a crude philosophic plane, and applied injudiciously on the biological plane, may bring on a European or even a world catastrophe. We need not search far in history to discover that the lofty-minded philosopher may be a grave social danger.

CHAPTER XIV

GROWTH OF INSTITUTIONS

MINOR SOCIOLOGY. So far I have dealt mainly with major sociology or the relations of national organisms among themselves. In turning to minor sociology or the evolution and growth of social organs and institutions it may be as well to say that shifting the viewpoint implies no change in the essential factors concerned. For if nations are the organs of a continental area or potential empire, then social institutions are the organs of a nation; departments are the organs of an institution; and subordinate sections, or 'rooms,' are the organs of a department. All these grow, change, and are maintained in the same way. For the politics of an empire and a village are exactly similar. To make the transition from major to minor politics should therefore not be difficult. We are at once concerned with the study of institutional organic growths, which develop on evolutionary lines paralleled by those of the national organisms of which they form a great functional part. They are thus internal organs, which obviously arise through varying structures functioning in social health according to the necessities forced on the developing national organism. And just as we have seen that nations must be continuously moulded by their environment and needs, so it is, and clearly must be, in the case of these organs which respond directly to stress by hypertrophy, and to over-stress by breakdown which tends with adequate variational repair to renewed and altered function.

GROWTH OF INSTITUTIONS. To illustrate the way such organs or institutions begin, grow, and finally conserve, or

regulate, after the manner of the glands in the animal body, is not very difficult. We see variations arise out of national character, but all the same often are apt to forget that the national character is the forced result of the environment under age-long stress. Not every English historian seems aware that his national ancestors, pushed perhaps from the shores of the Baltic, became thereby a conquering aggressive tribe of sea-nomads, which in essence the nation remains. And national character may obviously alter by increase or diminution. It will tend to develop organic means to achieve a growing national ambition. All who have reflected on the late war as a social stimulant must have remarked how environmental stress resulted in abnormally increased and even new growths of an unexpected kind. Departments went into mitosis, to use the language of cytology; they divided as cells divide. Or like hydroids they budded and sent out new individuals. Such phenomena are common to invertebrates and to low-grade national organisms which have preserved plasticity. We can infer at once that these developments under stress are 'natural' in every sense. It should greatly strengthen the general organic argument to show that all the factors of evolution were in high metabolic activity during processes in which most members of the present generation were deeply concerned.

WAR AND FUNCTIONAL STRUCTURE. No better examples of the origin of institutional organs can be found than those developed for national defence or offence. These in modern nations are in an extreme state of differentiation. Yet they must have arisen and can be shown to have arisen by and through the very earliest differentiation between a leader and a tribe which led to primitive staff work, probably in the hands of the elders incapable of active warfare. In all such tribes the whole nation is at war. It is obvious that this primitive staff was the protophase or earliest embryo of a highly differentiated

war office. In times of prolonged peace such an 'organism' is likely to grow over-rigid, and break down on stress. This likelihood may be its salvation. Left to itself it would be wholly out of date, senile, and sure it was right. But with obvious breakdown the inertia of the older conventionalized military and civil elements is overcome by the forced irruption of outsiders and a much increased metabolic rate. For many if not most of the more rigid and crystallized officials find that rate too much for them and retire willingly or on powerful suggestion. In the late European struggle the resultant plasticity of the war departments appears to have greatly exceeded that of a dangerously rigid Admiralty which was less diluted at headquarters, and by its incapacity to deal with the environment on plastic lines very nearly brought the whole national organism to disaster. I do not know if it would have been any satisfaction to those concerned if they had been able to recognize in themselves and their actions notable examples of failure to respond to evolutionary stress.

THEORY AND OBSERVATION. It seems to many a hard saying when they are asked to assent to the view that here and now in whatever situation they find themselves they are in the presence of evolutionary factors of which they form a natural part. Can that which they see in plain action account for the presumed magic and mystery of evolution? Perhaps the right answer for all practical or pragmatic purposes would be to say that the 'magic and mystery' have been invented and nourished by theologians without science or by men of science who should have been theologians. The political biologist and the biological politician, if such exists, should soon discover that in politics or biology ignorance need not be reckoned mysterious even in Burke's sense. Perhaps most of the difficulties found in all theories, to which the names of Lamarck and Darwin are indissolubly and honourably attached, can without doubt have light thrown on them by the observation

of processes in which they themselves are actually involved. Perhaps it is little wonder that the laity should feel like this when faced by the mystery that conflicting biologists and naturalists have made of evolution, by confining their inquiries to the outside form and marks of the animals, including man, and neglecting the more significant aspects of variation and construction, to be seen everywhere in the development of the internal organs and also in the phenomena of social growth and function. For if evolution does not determine social construction on variational lines of trial and error, success and failure, stress and repair, on whatever other reasonable lines is it determined? The question should be an answer to itself. If it were recognized that all the biological sciences are strictly relevant to each other sociologists and biologists could, and assuredly would, learn to use not only physiology but also the pathology which biologists have so strangely neglected. They could then scarcely ignore the fact that in the animal body as in the social organism repair was a mighty source of construction and sequent variation.

BUILDING INSTITUTIONS. This essay is not, and cannot have been thought to be, more than an attempt to get sociologists and politicians to use a great weapon of analysis ready to their hands. They have no right to be ignorant of biology. Without it their work, for which I profess a profound admiration even if I seem to have neglected it, is but begun. As soon as the principles sketched here are seen to be firmly based, many of the most contested questions in sociology as well as in biology will cease to be questions. They will solve themselves. For instance, there should be no great difficulty in this problem of the origin and growth of social institutions when it is seen that the urgently active living social organism is continually being pushed to build, or at least to lay the foundations of, innumerable institutions in which to employ free energy. A very little examination will show from what

simple protophases the greatest social organs spring. I do not know, and am not greatly concerned to know, what lawyers and financiers will think if I remark that we may easily refer banking itself to the early ungracious gratuitous bailee who demanded the profitable use of that which had been entrusted to his friendly care. It would be easy enough to prove that such social phenomena throw light on the very descent and origin of species and animals which may be due to variations of as simple a source as this protophase of banking.

A CITY IN EVOLUTION. We know that politics as an art arose in the managed life and economy of cities. To the Greeks the *polis* was the social organism, not a mere nucleus, and in a city as a political unit we may still find all the phenomena of origins. These are curiously demonstrable at any time and anywhere in a great city: in the everyday phenomena of its streets and the evolution of its business firms in active growth and slow decay. These apparently simple problems of the common trading, which is an essential in national nutrition, have been neglected and perhaps despised by biologists, but they offer numberless examples of small variations ending in vast constructions, though most in a given street are likely to decay in biological and actual bankruptcy. Many of these obscure variational beginnings can be looked on as 'spontaneous' in the Darwinian sense, but very little consideration shows what amazing complexity, when reckoned on human lines, must lie causally behind all such 'spontaneous' variation. We see at once not spontaneity, but determination, and may perhaps carry our conclusions back to biology and the environment as 'creator.' Where basal activity is great, variations in trade, in actual new building, or adaptation of old building, are continually coming to the social surface. To the observing they may in many cases seem as passing as the tumultuous waves of foam in a fermenting vat. Yet many of these obscure variations, which to the trader look simple, have immense

potentialities and may give rise in humanly reckoned time to vast constructions and essential national functions of relative permanence. That the great institutions or offices in which a country functions are thus strictly analogous to the parts of an important departmental store cannot be doubted. The end, or 'purpose,' of both considered as organisms is the perpetuation, increase, and security of the nation or store as a whole. This will depend on the various functions each fulfils and how it fulfils them, one of the chief of which is preparation against hostile organisms and ceaseless activity in protecting and enlarging its field of operations. It need not be emphasized that in organic nationalism, as in trade, what ceases to grow is probably on the down grade. The cessation of continuous advance and attack, and the substitution of passive defence, has always marked the fall of empires. 'Attack' in this political sense need not imply actual war, but it certainly implies the aggressiveness natural to any organism which has to feed, no matter on what pasturage.

THE 'MYSTERY' OF GROWTH. What Horrebow said of snakes in Iceland may be said of the 'mystery' of growth. There is no essential mystery in it that we do not make for ourselves. I have no intention of analysing in detail the origin and causes of social institutions, for enough has been said to show that they follow the general lines of growth. After all, the main point to consider is that all institutions and organs *are* growths and not preformed in any way, since the purblind organism has to prove by trial and error the line it must take to live and grow, and by which, perhaps, in the end it must perish. Such notes on institutions have distinct biological value. They mark and practically prove the fact that variation is nothing but the vast potentiality of protoplasm flowering on stimulus and stress. There is no need to make a mystery of it in an animal or a world organism. It has been made one by exaggerating natural difficulties in explanation. If in our

haste we affirm that variations emerge from the air or ether, or from the fated nature of things, or from archetypal sealed patterns or celestial blue-prints, we have created mystery where the unhalting student should see nothing but more patient labour. It is of course possible that those who have not occasionally aerated their scientific work with the oxygen of imagination will regard what I said above of the gratuitous bailee as an ill-timed jest. This I most seriously repudiate and will add to the offence by saying that if we are to seek into origins, and I can think of no more fascinating task, it would be possible to say that the early stage, if not the origin, of a national treasury might be found in the office of the first cattle-herder who guarded the tribal wealth (*pecus*). In the mammalian body we find numberless instances of banking, storage, guardianship, and even peculation and malfeasance. The cells whose duty it is to store fat take their necessary toll and profit, but sometimes will not answer the drafts made by the master tissue. The liver and muscles store glycogen or animal starch and issue it to be broken down again and used in work. There must be many other somatic analogues to match the social ones, but I have not proposed to write a complete social biology and therefore, though with natural reluctance, leave the unfinished task to younger students. If they find less mystery than they were taught to look for they can turn aside and still discover it in many text-books.

CHAPTER XV

THE INTELLECT, CAPITAL, AND PLANNING

EVOLUTION AND FORESIGHT. Many who have read so far may by now have come to think that foresight and intellect, however useful in matters of the day, play a very small part in evolution when considered in biological terms and time. Yet the belief in purpose, for which no basis can be found in science, has given rise to the theory that relatively great men can modify, deflect, and determine the course of biological events. If those who imagine themselves of this order are in fact the spear-point and spokesmen of a mass movement, their delusion is at least intelligible. But it is notorious that this self-exaltation is often found in those who can have no influence in political history.

PURE REASON POLITICALLY AND BIOLOGICALLY DANGEROUS. Apart from such examples of political paranoia, which demand no comment, there are prominent actors in world politics who advise, prophesy, and solve world-problems without so much as looking beyond the boundaries of Europe. That the uninstructed should err thus is not surprising, but that those who pretend to think in periods beyond a decade should neglect extra-European factors would be remarkable were it not more and more obvious that pure reason, and especially reason moralized, is far more dangerous in politics than honest stupidity. It might seem worth while asking what part intellect does play as a matter of fact in the mass biological drama, if indeed it plays any part, were it not that the question answers itself. I take it for granted that

intellect, reason, and verbal morals can have no place in the region of mass reaction. In both animal and social evolution their introduction is illegitimate.

REASON RAW MATERIAL OF INSTINCT. Intelligence, however, has a meaning for the naturalist. For him reason should be the necessary antecedent raw material of instinct. So far as mass instincts, or the forced tropisms of animal evolution in cells and tissues, build up a type or genus or species, reason has done its work once and for all. Instinct has passed into reactions, reactions which are the visible side of chemical and physical forces. But here we are dealing with political phenomena, and it is not to be expected that the average man, who is vote-fodder for his party, will analyse his leader or his own principles in scientific terms. He may even believe in an inspired leader and an inspired plan without a time element for it to work in. The active working politician knows much better and is profoundly disrespectful when intellect is flourished at him by outsiders, even if he has never grasped the fact that a successful revolution must be founded strictly on the biological past. The polite intellectual management of evolution must remain a parlour game.

RUSSIA: 'CAUSES' OF REVOLUTION. It must have been observed that I have so far abstained from illustrations ready at hand which might tend to excite political or national prejudice. Still, reluctant as I am to deal with current affairs which raise passions better suppressed, whether in politics or science, we may here turn to Russia. For the social developments in that country are of peculiar interest to the political biologist and the unprejudiced observer. If these are few it is because it is as hard to clear the mind of pity and indignation as to clear it of the simpler and more savage political passions. The driest light is needed here. Some of the Russian phenomena with extensive de-differentiation have been thought to prove that this or that leader can be the efficient cause of

biological results. So Rousseau 'caused' the French Revolution and Luther the Reformation. The belief in such 'gods,' in or out of the machine, though undoubtedly in itself a factor or activator, is likely to do more harm than good. It will tend to arouse hopes impossible of fulfilment. Such factors are biological no doubt and must be taken into account, but the cooler-blooded politician will discount them and perhaps minimize the disorder natural to a revolution. Not every inflammation ends in an effusion of blood. When it does that blood is the measure of the violence and a proof of the virulence of the revolution's antecedents. For though a great man can neither cause nor cure one he will scarcely fail to judge them as always justified in the historical sense, even if justice has no place or meaning in biology. The platonic idea of justice may be as dangerous in politics as reliance on the pure detached intellect. We may say, if we will, that the dialectical materialists activated or hastened natural biological and pathological work, since disease and disordered de-differentiation are natural methods in evolution. But if we go on to affirm the long continuance of an ideal equalitarian or classless state, we prophesy *in vacuo*.

CAPITAL OF THE STATE. If all that has been said of the inevitability of renewed differentiation is true, it is impossible that such a state can remain in accordance with a theoretic programme. Moreover the notion that capital can be done without or should be strictly confined to the State is utterly without foundation. Where there are dictators and their powerful henchmen there are already classes, and where there is delegated power to employ and direct material there are in essence capitalist agents directing the regimented proletariat. For this means forced labour, another name for slavery. The right to command really constitutes ownership and may renew serfdom. It is difficult to see how the 'idea' of capital could be carried further. It is assuredly a pity that these valuable

experiments in social embryology should be labelled non-capitalistic. For there is a side to this kind of social 'planning' which pretends to abolish private capital not generally recognized. This new and original State is after all in all its mechanical aspects directly based on the elaborate experimental work of the economic capitalist organism. To take the machines and the organization and training of such a body and then claim for the outcome a new economic basis is absurd. At the very best, if the new state succeeds, it has been built on a capitalist basis. And it is a curious feature in the new anti-capital communistic state that it has at once to borrow capital of all kinds to carry on the biological differentiation it cannot avoid. But I shall deal more directly with property and capital on purely biological grounds in another chapter.

DISEASE AND INVECTIVE. Nothing said so far should be regarded as based on any prejudice against revolutionary democracies, however destructive. It is absurd to look on functional or organic disease as something on which to exhaust invective after the manner of the shaman who cures us of evil spirits. These social disorders are material for the clinical politician to study. As I remarked in an earlier chapter, it seems strange that so much should be written to defend social violence by giving it a semi-metaphysical basis. The English, though not easily moved to direct action, are apt to consider the fact that they are very uncomfortable a sufficient reason to move towards it without *a priori* reasoning or any application to philosophers. And the average English politician will see at once that the 'one-plane' state is nothing more than a state in an early stage of evolution or one that must naturally result from profoundly based acute disorders. For to these there must succeed anarchy and death or the healthy resumption or growth and differentiation. The philosopher might think it hardly worth while going through so much to get no more

than the privilege of beginning again, but till statesmen learn the a b c of State medicine as a department of biology, these disorders will recur, and invective will once more be wasted on purely normal results. In any national illness all the symptoms are as natural in every sense of the word as they are in human diseases. This John Hunter taught and his words apply to States and nations as they do to men.

THEORY AND POLITICAL DETACHMENT. To take such views may need an uncommon degree of detachment, but if that is required of a physician it may equally be asked of a statesman who is more than a hack politician. He should understand the disorders and weakness of political theory even if to ask him so much is to require him to believe that biological and evolutionary laws apply to the growth of theory itself. It does not need profound thinking to see that in their development and application, their success or their failure, all theories must inevitably conform to the law of stress, breakdown, and repair. They do not spring full-born from the brain of genius. I propose in this essay to offer the politician some biological means of determining whether the disorders he has to treat will be cured by natural reactions, or should be treated with the knife. Or perhaps by the axe and rope. In all the cases it will be seen that laudation or invective has no place. Invective may be left for those who have no real biological, legal, or medical case. I do not deny that invective may serve sometimes as a measure of the seriousness of the social disorder. But though the roused mass passions of humanity, like the mass disturbance of tissues and cells in the body, have their place, especially in de-differentiation, the politician should reckon them up not in rhetorical or psychological terms but in the manner of a mathematician, a logician, or a surgeon.

ARISTOTLE AND MACHIAVELLI. This attitude to social disorders may excite some of the passions it is most useful to

avoid. Although it is true that many great reforms seem to call for a degree of passion not compatible with this detachment, it is well if in a body of organized politicians there are a few who exhibit sufficient scientific calm to read parts of Aristotle's *Politics* or his more ruthless disciple Machiavelli, even if they cannot imitate in all things the evolutionist who is merely an observer. To him the wildest revolution should be nothing more than a series of interesting biological phenomena, as he stands, or endeavours to stand, historically detached from it. So the physician may take notes in calm even by the death-bed.

WARNING SYMPTOMS OF REVOLUTION. It is, at the very least, certain that if great revolutionary phenomena had always been thus observed less hysteria might have been displayed about their horrors, or, on the other hand, about the glorious prospects they opened up for humanity in general. Yet there are those who still refuse to learn that gross evolutionary disorder in social organisms is in every case due, not to any revolutionary philosopher, but to the loss of social flexibility and that response to warning symptoms which some hope for as foresight in the ruling class. This response is rarely found, since excessive class feeling, which tends to run counter to tribal feeling, naturally blinds those whose passions put personal salvation first and the tribe second.

DESTRUCTION OF TRIBAL SPIRIT BY INDIVIDUALISM. The political delusion which depends on the fallacious notion at the back of 'planning' that intellect, especially when estimated by the possessor of a theory, can dominate biological processes, must be laid at the door of exaggerated individualism. Even in face of convincing proof that individualism fostered to excess, as it has been by politicians and philosophers alike, always tends to destroy the tribal spirit, it is held by many who overrate their own intellectual powers that renewed national tribal organization is gross reaction. It is, however,

often an instinctive move against disintegration in the face of political danger, and against instinct the most powerful intellect or combination of intellects will move in vain.

BUT ALL EVOLUTION IS 'MORBID.' If such a discussion trenches on what is usually known as 'philosophy,' in most of which I discover personal and individual speculations about things of which we know very little, it cannot be helped. For such philosophy is mostly the rationalization of cherished prejudice and irrational hope. As a defence for trenching on it I think it may be urged that this essay betrays no undue optimism or a belief that evolution is anything but a morbid process of which the outcome must be always doubtful, especially in societies which have yet far to go in co-ordinated differentiation. If a caste system should ever be attained it will doubtless suffer breakdown in its turn. 'Planning' and prescriptions by the pure intellect may, perhaps, delay but will not prevent its fate any more than they will, in the hands of the physician, prevent individual death.

INSTINCT FOR RULE. Nevertheless it may be urged that a useful knowledge of biological processes may end in begetting instinctive wisdom in a hereditary ruling caste. Dim signs of this can even now be discerned. Statesmen may learn from the very phenomena noted by the biologist. They should not require him to demonstrate that all political systems which are not plastic are liable to end in revolutions. Again it may be said that elasticity is life and rigidity is death, just as the absence of a moderate tendency to stasis means social dissolution. There is in all living units a rhythm as there is a 'song' to the working of an engine. Statesmen should learn that life itself is not a principle or an entity but a function. The cellular system of the animal body is built on reversible colloidal systems vibrating between liquidity and solidity, in bio-chemical terms between sols and gels. There can be no

absolute equilibrium. 'A system in equilibrium is, in fact, dead.' There can be no permanence for institutions. If they are considered sacred by those nutritionally dependent on them it is a proof they need biological adaptations. Continuous change and new adaptation is obligatory for property and capital. We can see in the animal body that the accumulation in the cells and tissues of unnecessary or excessive non-protoplasmic elements is a sign of age, a mark of senescence and possible early death. The cells may have great useless possessions and die of rigidity. A society or social organisms with much property, of whatever kind, is dominated by that very fact. It ceases to have evolutionary liberty. Like many rich men it is dominated by its banking account. This is a sign of dangerous conservatism. The young politician with great possessions is likely to be 'older' in this sense than a hoary-headed colleague with few or none. It is easy to waste a social or political life in guarding what destroys ease of function and adaptability. Such simple physiological facts may be the beginning of political wisdom which certainly cannot result from the exercise *in vacuo* of the pure intellect.

WISDOM AS BIOLOGICAL DISCRETION. To what extent the intellect, and wisdom as the practical intellect, fulfil a political function is doubtful, if more is asked than a capacity for waiting and watching. Waiting for the cat to jump is a political principle rooted in sound biology. But there are many unsound principles that may have biological analogues. If protoplasm were imbued with wisdom of a high theoretic order it would not be at the mercy of trial and error and would know what to do. And so would a politician. As it is he remains a creature of his hour and the clock and does what he can with those who go with him. If they take the evolutionary path which leads to comparative ease they will all alike deem it due to their intelligence. Perhaps intelligence

can be discovered in no other way. Again we come to the conclusion that the notion of a particularly powerful intellect, not the spearhead of a powerful party, leading the way that party is set on going, is a political and biological absurdity. Casual irruptive prophets are not evolutionary factors. There is much to be said for the impatience of the politician with these intelligent men. They actually believe that their advice if taken in time will lead to the immediate adjustments of society needed in a period of rapid evolution. Or even in revolution. Thus it seems we might avail ourselves of arbitrators who by the sheer force of their intellect and personality could arrange such differences of opinion as divide the world into armed camps. There appear, however, to be difficulties in the way of inducing dictators to be dictated to. Perhaps special intellects with special 'plans' may remove such obstacles. But it must be owned that most political writers tend to overrate intellect and to exalt it to the rank of an effective factor in evolution. This I esteem the greatest flaw in Walter Bagehot, in whose quarry many have laboured without acknowledgment. To Bagehot reason was as a god and in that he was of his age and hour.

INTELLECT IN BIOLOGY. There is, however, no more need to underrate the intellect than to exalt it. By the word I mean no more and no less than the reactions of the fore-brain in face of the unsettled and dangerous environment. It is nothing but the instrument which decides by experiment and trial and error. To analyse it is then not beyond the argument. It is a biological tool and weapon. I do not wish anything said here to be regarded as satire on those who regard it, especially in their own hands, as much more. These philosophers are of themselves very interesting phenomena, peculiarly characteristic of disturbed social metabolism. But for a biologist, of what rank or order matters not, the notion that one man or a few in holy alliance can determine the evolution of

many organisms fighting for life in a testing environment, seems a gross absurdity. The future, whether fortunate or disastrous, must emerge on biological principles. In face of the capitalized past on which and by which organisms live the individual or personal unit is of no importance.

CHAPTER XVI

CAPITAL AND COMMUNISM

FINANCE AS AN ORGAN. In returning to the subject of capital and capitalism I do not propose an elaborate discussion of the merits or demerits or even of the 'crimes' of capital. These may be gauged as in other cases by looking on it not only as a system but as an organic growth, a living organ of the social body which, like all growths, tends to run into variational extravagance in its energetic attempt to develop further and perpetuate itself. Violent reactions against it as a spreading system are as natural as its own development. It should therefore rather inspire curiosity than invective. If we are to seek origins it may at once be considered on the physical level. For cosmic energy is itself capital and the laws of thermodynamics must rule where energy flows. As cosmic energy runs down it builds structures in which it has to work. And these structures are themselves bound or fixed capital energy. If we convert these propositions into biological terms it is clear that attempting to do without capital is equivalent to proposing to do without physiological reserves. As I am little inclined to discuss proposals to abolish physics and physiology it may be as well to turn at once to a less controversial aspect of capital, the manner in which the animal organism owns, stores, controls, and distributes its energy. Perhaps it may usefully be repeated, in a civilization only now tending to emerge from an individualism which has almost destroyed natural tribal functions, that differentiation on a basis of common basal nutrition needed for easy working is the 'plan' followed by the animal body. With local anaemia, lymphatic

stasis, or innutrition there will be first functional and then organic disease. To each cell or tissue or organ enough energy should go for it to work smoothly. For ease is bodily and social health. This no doubt is a physiological doctrine. I do not regard it as a misfortune that it is also a communistic one. They say that the ultimate aim of communism is—from each according to his ability, to each according to his needs. No theoretic physiologist, who deals with the ideal, can quarrel with this pure doctrine, even if he turns to the pathologist to ask if in the healthiest body such an ideal can be reached. Nevertheless, however far off the goal, it cannot be denied that a return on a higher tribal plane to tribal nutrition is indicated in all modern social organisms. So far the communist is a physiologist. It will be shown later that one great antecedent of the tissue revolt we call malignancy is a failure of the local commissariat. The epithelial cells of the skin do not revolt because they perhaps live only some six weeks. They are not socially or politically jealous of the nerve cells, which normally live for the lifetime of the whole body and are lapped in lecithin. Well-fed workers in shops, in armies, and in navies, who live in an accepted status, are little likely to revolt. These questions of nutrition as a tribal necessity should be commended to those who are blind to the factors working towards the destructive de-differentiation which may prelude communism. Whether any argument however cogent or any voice of alarm however loud will awaken the million sleepers of a political Ephesus may well be doubted. But if the intellect is as hopeless an instrument as I have suggested, perhaps tribal wisdom may yet prevent what most dislike, what need not happen, and what, if it does happen, will certainly not result in a lasting state of communistic undifferentiated equality.

THE CITIZEN AND DOCTRINE. Before going on to deal with particular aspects of capital and property, a word may

be said on the view that teaching which puts reason out of its seat of doubtful authority may render the common man, on whom in mass the fate of nations depends, so fatalistic as to baulk his natural energy. Instead of doing him harm it should rouse him to the value of his instincts and to grave distrust of doctrines and doctrinaires of all orders. It may help him to believe in instinct if he learns that the fore-brain which deals with unsettled problems is derived, not as he might think from the primitive organs of sight or hearing, but from the apparently humbler organ of smell. His ancestors smelt their way to their doubtful eminence in the animal world, and knowing this he might dare to infer that the main task of evolution is not to tell him his way directly, but to teach him to trust his instincts lest he go wrong.

CELL LIFE AND PROPERTY. Nevertheless, since the whole of this analysis amounts rather to warning than to direct teaching, something more may be said of property and capital. I do not wish to discuss or reason about either. They are indeed practically one and should not long detain a biologist. For the instincts and tropisms which create and deal with property are far deeper than instincts. Upon any examination it is clear that they are rooted in bio-chemical and physical reactions. In an earlier section it was shown that all cells with a nucleus possessed tools and weapons with which they did their work, provided their defence, and preserved their status. These chemical and bio-chemical tools I have not the least hesitation in describing as their property. A very little knowledge of physiology provides us with a vivid picture of early pale somatic cells picking up a salt of iron and using it to hold and carry oxygen, which helped powerfully to build up animals with red blood. Every cell of whatever kind has a complex armament of enzymes and catalysts which at once govern and facilitate its operations as a working corporate 'individual' made of protoplasmic units.

It should require little imagination to carry these analogies into the life of cellular grouped humanity, with its units picking up, holding, and transmitting, just as cells hold and transmit, their means of doing their work and keeping, perhaps increasing, their essential status. I commend these notions to the legal profession if they should be hard pushed to defend the descent and inheritance of property. For property in this light exhibits even more than a basal instinct: it calls for the scrutiny of a physicist. To say so is not to argue that this push for ownership and the tools of power, which possession in a social or somatic sense implies, may not justly and physiologically be curbed and inhibited. It is merely a clear argument for all units to possess sufficient 'property,' in whatever sense we use the word, to secure nutritional efficiency in the social organism to which they belong. Where it can be shown that property impedes efficiency and damages social health I know of no remedy but a reaction which may legitimately amount to a revolution; that is, to a violent febrile social disorder. But so long as a reasonably efficient social balance exists the whole argument justifies the relative allotment of property provided that any system which permits innutrition in order to accumulate and misuse capital is condemned. It is disorders of this kind which inevitably lead to communistic action. Where there is really effective nutrition in a society it is easy to observe that even absurd social waste and ridiculous opulence excite no particularly dangerous reactions. To discover somatic analogues is not difficult.

PROPERTY AND THE STATE. There might be some excuse for saying no more of capital. The omission to do so would not be due to a faint heart, though indeed any heart might quail and fail when attempting to deal with the mass of passionate irrelevances with which the question is entangled and confounded. I have yet to learn that any sociologist has properly prepared himself in physiology or in biology.

For the most part they therefore know nothing of general evolution. Thus reformers with the simple communist mind end like Porson in damning the nature of things which in their romantic idealism they have failed to understand. For if individual cell possessions are 'property,' the possessions of the larger units and individuals are just as legitimately property or the acquired capital with which they work and keep their status. If this is admitted it follows that the still larger units may hold and use capital, those trades, corporations, and institutions with and through which the State or social organism gets its work done and its status preserved. There is certainly no warrant in physiology for giving the central nervous system complete control over saved somatic capital. Neurologists observing the brain's instability, perhaps in company with alienists, would view such a somatic prospect with alarm. Capital control, though it may most undoubtedly be necessary, since any 'institution,' as I have shown, is liable to disastrous overgrowth, must in the lower-grade social organism be left to work itself out in evolution. It is folly to expect in such an undeveloped 'individual' a degree of organization wanting even in the most perfect animal organisms. I think that all those with knowledge of, or with feeling for, the way in which social organs work in sub-hostile symbiosis will see at once that there can be no biological argument against capital. Yet to say so is a strong argument for the social attempt to control it when overgrowth has outrun normal inhibition and threatens social disaster and disease. Capital, then, is a natural phenomenon and cannot be abolished till we abolish physiology and physics. What begins in nature with the egg will continue as long as eggs are laid. Sir Arthur Keith writes: 'It certainly is not the use of capital which makes human societies insecure. In all her advances in the evolution of those composite societies which make up the bodies of plants and animals nature invariably secures her progress by

the freest use of capital. Every egg we eat, every loaf we consume, represents capital nature has saved to rear a chick upon or on which to raise a thousand heads of waving wheat. The human child itself is made a charge on the savings of the maternal colony—its mother's body—for the pre-natal months of its existence. Nature's greatest society, man's body, was reared on capital.'

CAPITAL CONTROL. On this I shall say no more but shall leave it to the intelligent student to look for, and perhaps to work out on somatic lines, a physiological method of controlling capital overgrowth, waste, and its social misuse. Those who have grasped the principle involved in glandular control, immunity, balance, and nutrition should not long be the victims of political doubt, or, worse still, of political haste. They will remain calm even when deafened by appeals against the methods of evolution emanating from breathless reformers moved rather by heated personal emotions than by the cooler intellect. I cannot refrain from offering them something to consider more quietly by saying that political economy itself will take on physiological and not inhuman characteristics if we consider it as subsumed under the great inclusive heading of Nutrition.

CHAPTER XVII

DISEASE AND DEATH IN SOCIAL ORGANISMS

HEALTH AND DISEASE. The discovery in disease of vital analogies between the soma and the social organisms is not difficult, even though we have no way in which to define health as a simple concept. Yet the word used for failure in function of the body practically defines health as ease of working. For disease is properly dis-ease. We say at once that health is the easy working with each other of the organic parts. This can be applied in theory to the social organism as an ideal physiological machine. But evolution takes no notice of diagrams in a physiologist's or sociologist's note-book and knows little or nothing of ideal ease. For it has been shown in previous chapters that there is no perfectly healthy animal or social organism. An animal begins to die before it is born. The same may be said of social organisms though their death is longer deferred.

DISEASE NATURAL. Apart from such simple considerations I do not intend to deal at length with social disorders, most of which are, as I have demonstrated, normal methods of reaction to stress. Hunter's view of disease as natural in the animal organism can at once be applied to societies. Symptoms which a very little time ago were looked on as disease are now reckoned signs of the efforts made by the organism to free its functions from disordered stimulation and inhibition. This view of symptomatic reaction is a clear and simple notion, valid for the physician and statesman alike. It will serve the engineer as he listens to the heart-beats of an engine,

the anxious architect in charge of a decaying monument, and all who have authority in times of rapid change. Thought on these lines relieves the politician, but it does not imply that the conditions of the social body usually conceived as healthy are in reality anything of the sort. There may be a delusive appearance of social well-being. So in the human body a hectic, even a cardiac, flush may simulate health to the unobservant. One pronounced social characteristic held to be a sign of health is certainly nothing of the sort. I mean the exaggerated individualism which in our own nation has so greatly broken down the tribal unity necessary for easy social organic function. Hard social conditions undoubtedly lead to a return of tribal organization provided there remains reasonable central control. If the stresses are extreme there will be social disintegration. But enough has been said to show that most social disorder is symptomatic of normal organic rhythmic processes carried to excess. They may of course end in complete breakdown if neglected, that is to say, if there is no compensatory reaction. With this the physiologist, the bio-chemist, and the physicist must inevitably agree. We may now discuss such slow processes of the kind as do not bring about grave disorder but mere social malaise analogous to the milder somatic distresses hard to recognize and hard to treat. Absurd as it may sound to the average politician, a social organism can be in a condition only to be described as being 'ill' and therefore unhappy.

SOCIAL MALAISE. That a generally low state of national health of the kind suggested is largely the result of exaggerated and uncontrolled individualism can hardly be doubted. At its worst exaggerated individualism is denial of reasonable tribal instincts. It tends to bring about unnecessary social divisions, it over-accentuates normal class distinctions, and indirectly stimulates communism, which must be reckoned

a forced biological movement against a destructive environment and innutrition. But few national organisms have a national medical service or a trained medical Minister of Health with stringent powers and great central influence. Locally we see the medical authorities of rural districts in the hands of cottage-owning patients they dare not offend. I am right in placing such political and biological value on nutrition as I have assigned it earlier, it is clear that its lack in unhealthy conditions is a symptom of true social disease. If politicians are aware of this they rarely act on it till the disorder calls for a surgeon and the police. It must be allowed that there is now a strong movement towards powerful medical control, but so long as the medical profession has to fend for its own nutrition in a gross individualistic struggle for life it cannot work directly for the organism to which it owes complete allegiance. There are now signs that a medical service may emerge. In the meantime the nation and the materials for such an organ do what they can, not always on biological grounds. With more attention to the environment and less to the preservation and propagation of the unfit there should be a rapid improvement in national health. On these points there would probably be a conflict with an organic institutional growth occupying a position from which it is now being pushed, the Church, or churches. The exaggerated value attached to life *in esse* and *in posse* by these religious organs will continue to hamper the medical and surgical functions of national medicine. As soon as these phenomena are thus related it is seen that they fall into their place in biology. I take the occasion to say that I shall not analyse religious growths as I have done others, since everything that has been said of growth, over-growth, stress, breakdown, and repair applies as closely to a church, of whatever order, as it does to the evolution of a store or a corporation. That their influence has made for social health or organic harmony cannot always

be said of these organs or organisms. Had they done so national and international medicine might not still have belonged to the expectant school. 'Religion' considered as a body of units seeking position and power has often been a tribal disintegrator.

THE STATE AND THE 'PHYSICIAN.' So far I have held the balance even between political parties by showing that the organic theory of the state assigns important but rhythmically varying functions for them to fulfil. The analogy between these reactions and the rhythmic reactions of colloids is especially valuable in discussing social health and disease. In the diagnosis of social disease it is necessary to avoid rigid doctrine of any sort, for a strong and increasing political movement as regards disease and innutrition is definite proof of serious tribal uneasiness. It cannot be disposed of by catchwords or commissions. The intelligent and dispassionate communist, who is not so rare as most imagine, might well urge that the doctor devoted to social hygiene was on his side. But there is no political movement backed by a militant minority which has not been justified and created by those who resisted it. There may be haste and folly in reform but not the disaster bound to occur to the body or the state in which central rigidity immobilizes and anchyloses free functional parts. It is no doubt painful to parts of the body thus immobilized to have adhesions broken down. It is equally painful to the static politician to be forcibly moved on and made to own that the health of the social organism of which he is a part is biologically disgraceful, though he may perhaps be personally excused. For all things resist change. The thymus gland may be pictured as vigorously resenting timely political and somatic extinction. The state as a patient, however, does not die easily and the political physician discharged from the bedside may live to find that the state recovers and the doctor dies at the polls. It is well to know

that a nation may be 'ill' without a single statesman showing signs that he is aware of it.

TRUE NATURE OF SOCIALISM. Socialism is assuredly misnamed or misunderstood. It should mean solicitude for social well-being. But all parties believe they are the only sources of sound political energy. As a biological fact they are all pushed by the most immediate needs of which they become conscious, and all alike are stimulated or restrained by fears for their own nutrition. But physiological repair, so urgently needed to prevent severe social disorder, is looked on by those who attend to it at last as due to their own wisdom and foresight. The conservative critic working on the general principle that haste is dangerous and change disagreeable takes the lag of action imposed by normal social inertia as due to his own virtue and valour. All parties take titles from the biological work they are most fit to attempt, even if they perpetually fail in satisfactory achievement. We can infer that the word 'socialism' might easily be discarded or definitely interpreted as physiological sociology put into action and strong suggestion when obstructed social functions threaten disorder. By implication this is to affirm that construction, repair, and reform must wait on exhibited need or on those symptoms of normal disintegration and reintegration which the over-anxious politician regards as abnormal. But social ill-health in this sense is all in the course of evolution, and the sooner the symptoms emerge into daylight the better. So far as socialistic action discloses them it is all to the good. The whole argument shows that it matters little into whose hands repair falls, if it is once seen to be necessary. Acute internal disorder usually results from physiological slackness in response. Looked on in this way there is no need to regard socialism as a difficult subject or a political bogey. It has been made so by its opponents, who by their exaggerated fears of a normal social process have endowed the doctrine with all

the qualities of anarchic communism. The fears resulting from this conservative caricature of socialism have not been lessened by militant socialists, who have deluded themselves into the belief that paradise lies beyond the next election, and that normal processes of social repair and better function are due to their particular party's courage, skill, and peculiar cerebral endowments. Saying so may perhaps be almost as much resented as utter silence might have been. But the fact is that from the earliest pages I have done little else than talk of the real function of the socialists. In one passage I even gave them direct credit for advocating social repair, though they obviously did not understand their own function. They had, as I now suggest, so decorated and obscured the natural law of repair as to make it scarcely recognizable. The humble biologist, as he stands on the little elevation that lifts him above the dusty agora, or perhaps the political field of blood, can but wonder at the uproar made about the creed by those who advocate and by those who oppose it. It is true that it seems to be a political and economic principle to cry out most loudly before being hurt and naturally the most conservative cry the loudest. But since even these must admit that no one has yet found a means of avoiding change they might at least steel themselves to the normal trend of continuous reorganization of which few sociologists, if any, have discovered the normal biological basis in stress, breakdown, and repair. Fortunately it is possible to be a biologist without knowing it and to work on the right lines by social instinct while cherishing the delusion of the directive intellect. There have been great politicians with enough wisdom to stand them in place of a scientific education. Burke believed his country was a living organism with its character determined by its history. Yet it will probably be a long time before most politicians recognize that no party can exist, perpetuate itself, and do work without having a fundamental basis in biology. This must be true

of socialism itself, however extravagantly its special doctrine has been overgrown by irrelevant and even preposterous idealism. We must assign it a definite place as an organ of repair and a conservator of social energy. So much has been demonstrated in this essay, and the demonstration may tend to allay in a measure futile but natural passions almost of religious intensity.

THE STATE SEEKING HEALTH AND EASE. Judging from political treatises, and even more from political talk, it must always remain difficult for those unaccustomed to inquire with detachment into the many ways one set of phenomena can be regarded to look on political movements and theories as the mere verbalization of the whole social organism striving blindly for health. How can we combine the apparently separate class movements with the undoubted somatic, or bodily, truth that unity is health and separation disease? Only by recognizing that the physical or mechanical unity of any working machine is reached by the opposing thrusts of its working parts. Unity in the sense of absolute want of tensions means nothing. There is no perfect action outside a diagram or a smoothed graph. If I am right in considering the hostile symbiosis of bodily parts as the essence of individual life and development, then hostile symbiosis applies to the social body and all increases or great and disturbing decreases of social tension will naturally be regarded with the alarm that social or somatic disorders inspire. It is not cynicism to say that most social alarms might remind a physician of a mother with her first child, sending urgently for assistance whenever the infant cried. All social organisms that we know are still little more than embryos and the experimental embryology of states is nowhere so much as suggested if not in this essay. What has been said should calm the more timid politician and save him much discomfort.

DANGEROUS SOCIAL DISORDERS. If this is rather in the

nature of an anodyne for those who tend to find communists nightly under the bed, it cannot be denied that there are highly dangerous social diseases. The merest novice in history knows that during the long years of their inception and secret progress the gravest social revolutions have invariably been utterly ignored while attention was centred on harmless concurrent functional disorder or class discomfort. Many somatic disorders have a like long prodromal period. They may be unrecognized by the patient or those about him. It is part of the heavy burden borne by the conscientious physician often to recognize by the operation table or the deathbed that for long he had treated the patient for something that did not exist, had failed to recognize what was destined to be fatal, or had even assured the dying man's friends that there was nothing seriously wrong. This is often the case with the statesman, but deep and hidden processes leading to disastrous social outbreaks may take so long that generations of statesmen pass before their incapacity is finally shown in a revolution. There is little need to refer to the case-book of history. It is significant but little noted that the profound natural conservatism of a people, on which politicians rely overmuch, is seen at last to have been a great factor in the violence finally provoked. With nationalities less restrained the evil and oppressive conditions might have been mitigated earlier by the alarmed ruling classes. Assuredly the natural conservative patience of a people based on instinct is so strong that only prolonged and desperate mismanagement can bring about a great social upheaval. Even then it is a historic fact that revolutions are achieved by an enraged minority. It can be said that they are always justifiable. It is as unreasonable to say they are not as to argue that death in the final delirium of a catastrophic fever is an occurrence without reasonable cause.

ORGANIC DISEASES. As nations do not die of acute

disorders it may be asked if there are organic disorders which bring about national death. To ask so much might lead to a disquisition as to what constitutes death in a social organism. This is a task for a historian which has never been adequately done. Anthropologists, however, take national and racial deaths for granted and put them down to invasion and final swamping. Many social organisms, perhaps of a high order, have perished at the hands of enemies who, as cannibals, literally devoured them. For cannibalism has assuredly been a great factor in evolution. Other races must have perished in flood, famine, and the stresses of the glacial periods or even great and fatal epidemics such as affect at intervals some species of animals. It is obvious that social organisms can die and leave but a few bones and flint implements. The palaeontologist, with a longer view even than that of the anthropologist, would quite naturally class human races, species, genera, and all social organisms with the numberless forms of life which he knows have emerged from the shores of the Cambrian seas to march across the stage and pass beyond the horizon. The time must come when Saxon, Frank, and Teuton will be confounded with Assyrian and Babylonian dynasties, even with the Magdalenian or the Mousterian. Here we can reasonably confine ourselves to asking what a nation can stand in the way of outside stress, internal misery and hardship, malnutrition and malaise, before it finally succumbs. For the biologist a national organism dies when its units are merged in a greater organism. It is politically dead when it ceases to be a factor of power. A pacifist social organism is practically dead. To say so opens up a line of investigation into the ways a social organism can be 'infected.' This is a subject of great interest and as much difficulty. In what manner can biology treat 'infectious ideas' as evolutionary factors apart from psychological interpretations which it must ignore? Undoubtedly the answer turns on the nature of

social immunity which cannot be treated apart from somatic immunity. I propose, therefore, to work out as shortly as possible a few social and somatic analogies of immune action which can be discovered without unduly tasking the imagination.

CHAPTER XVIII

THE ORGANISM AND IMMUNITY

SYMBIOSIS AND IMMUNITY. It should not now be necessary to demonstrate that organisms built of differentiated sub-hostile parts must be able as a whole to use the excretions of those parts for internal and external defence. This is the essence of intra-organic immunity, and the recognition that such a fundamental competent protective system in the patterned parts must exist helps us to understand the great power of the body to protect itself against internal disruption and external attack. Such a system cannot be perfect, and perfect immunity is impossible. Normal somatic and social health may mean no more than toleration among the parts of the body or sections of the social organism. For we are bound to infer not only that there will be a like immune system in civil societies but that it will be a highly simplified crude and primitive analogue of the somatic pattern. Thus social tolerance is a case of incomplete immunity.

IMMUNITY AND THERAPEUTICS. I do not propose to introduce the politician, or even the sociological student, to the difficult subject of immunity as treated by bacteriologists and all but a few immunologists. Much of its complexity is due to a profoundly unsatisfactory vocabulary with which its exponents explain obscure colloidal reactions. It is probable that few practising bacteriologists will at once admit social analogies into their art and science, and even the general student of medicine may find it as hard to broaden and generalize his notions of immunity as the politician whom I more particularly invite. Nevertheless something may be said

on the medical side in order to enable the outside student to grasp analogies with social phenomena which immunity affords. Not impossibly anything thus gained may be of value to medicine itself. I shall as far as possible avoid the use of technical terms. There is little need for a vocabulary which is harder to understand than the subject. The simplest way to think of immunity is to look on the human body as a complex social organism, and the national organism as a simpler functional individual, or 'person,' both of which are exposed to dangers of innumerable kinds for which they must continually provide. This provision is immunity in action. In both cases what are called technically 'antigens' are factors, alive or dead, which by their chemical composition, if non-living, or by their chemical products and rapacity, if alive, cause functional or organic mischief with or without warning symptoms. The statesman can have no difficulty in thinking of social antigens. But if he asks what is an 'antibody' and learns that it is held to be a special product which neutralizes the antigen or its toxins he will naturally turn to the social organism and ask whether special agents are needed, or created, socially to deal with every fresh trouble. He will find that all usual social reactions against social 'antigens' are due to the natural defensive powers inherent in the citizen and the more or less specialized police. The inquiring politician might even wonder whether the postulated physiological machinery of which he read was a reality. If he learnt that there was in the animal's body a very remarkable and highly organized system of fixed and mobile cells which performed medical, police, and scavenging functions he would doubt the more. He might even reject the complex explanations offered him when he learnt that many organisms were normally and naturally immune. In virulent epidemics many, however exposed, are never infected. But immunologists rarely, if ever, put in the forefront of their argument the natural immunity of

the healthy man who may sleep unharmed with a smallpox patient, swallow cholera vibrios, and ignore alike the mosquitoes of yellow fever and malaria. It seems that this natural immunity, so desirable for the animal and social organisms, is the touchstone by which to test theory. The sociological student would naturally turn to the society in which he lived to look for social immune reactions and their mechanism. It seems probable that he might at once hit on tolerance and social toleration as the raw material, or the early form, of social immunity, when he studied the ways it broke down and was restored.

ENDURANCE AND 'PEACE.' For tolerance is thus a key to the general constitution of society. Tolerance is reciprocal endurance. Endurance is a disagreeable tribal necessity. Social tolerance is getting used to others as individuals, sole or classed, without visible revolt. Social immunity is thus largely 'putting up with people,' often under protest. In physiology the actual bio-chemical reactions which induce tolerance are the natural defence of the parts. No one yet wholly understands them but no help can be found by using words which beg a bio-chemical question. It is easy to see how immunity and tolerance are related to status. All social or somatic reactions discover effective agents in the defence of a differentiated or differentiating part. As we have seen, the essence of differentiation consists in a capacity of attack and defence. Defence at least is a *sine qua non* and the relevance of war itself as immune action is seen at once. There can be no difficulty in understanding attained 'peace,' consequent on assault and effective battery, as an immune reaction. There may be armed tolerance on the watch. What cannot be used or endured must be ejected or rejected, a fact in social physics easy to understand. Atomic and molecular attraction and repulsion must be the final source of all like reactions in protoplasm.

IMMUNITY AND NUTRITION. If protoplasm, in whatever form it is found, has to be capable of defence, it must also be capable of attack. Its power to deal with the chemical and physical world depends on its capacity to create and use a disintegrating apparatus of chemical and physical factors. The animal body has to attack the lower organic world and live on what it can wrench from it with immunity. For nutrition is built on the acquired animal capacity to deal with harmful and poisonous matter. If society has to live with what it can use and put up with, the body itself puts up with what it can get and uses it by breaking it down with a powerful biochemical armament and rejecting what it cannot use. The way in which poisonous products are handled by the body is a fascinating page in physiology. For all food is poison to start with and remains such till it is immunized. Nutrition, in fact, is a process by which 'antigens' are broken up, made useful or harmless. The power of the animal organism to take complex flesh proteins and so alter them that the liver, glycuronic acid, and various salts eliminate or neutralize the protein toxins set free by digestion is, then, an immunizing process. Allergic disorders are those in which inborn errors of metabolism hamper this process.

NATURAL IMMUNITY. It seems clear that in nutritional, as in other disorders, the physician's business is to aid and restore normal immunizing machinery. In infective diseases he asks the bacteriologist not to cure the patient but to assist an enfeebled apparatus to do work. To this end all his own efforts are directed. The relevance of this to social disorder is clear. The politician must see that natural social immunity rests in a normally contented and easily working population. He will understand bodily and social 'strikes.' The general theory of immunity should equally be of use to those sociological students who too easily show what may be called protoplasmic alarm at political antigens of an extreme order

such as provocative communism. It must help them to learn from physiological analogy that there is a competent defence system for the social as for the somatic organism where the mass of social units do not suffer from innutrition, malnutrition, or injured status. If the task of the politician is to conserve immunity and to preserve the status in which he finds his country he will see that a complete immune system includes defence and the positive neutralization of external aggression, not by panic-stricken construction but by continual adequate repair of the nation's gradually acquired powers of resistance. Such a system would be immune against all known stresses since the normal reaction of a nation or any organism is to build increasing defence against increasing stress. The physiologist will think of Wolff's Law, which was formulated to show that bone under increasing or altering stress was increased or reshaped by the active osteoblasts or bone cells to meet the new stresses. It is a more general law than is commonly stated, for muscle also responds directly to stress by a functional hypertrophy. With continuous social repair there should be no need for hasty measures or special 'antibodies.' The healthy organism reacts in its naturally evolved capacity to meet all likely attack thrust by thrust. The defence system, if not starved, will grow to need. If the normal cellular and organic resources are lacking, or wrongly distributed in the animal organism, and their analogues lacking or misplaced in the social system, the result must be asymmetry and national incapacity to meet insult or assault.

THE RETICULO-ENDOTHELIAL SYSTEM. So far I have said little of the living machinery by which the animal body maintains immunity. It seems possible that an intelligent and curious student, who was uncommonly ignorant of the elements of physiology, might yet be moved to ask if there was nothing in the body which suggested an organized police. This will certainly be found in what is known as the Reticulo-Endo-

thelial System, a system isolated and recognized as essentially related, which consists of stationary and wandering cells originating in the spleen, the splenic capillaries, and sinuses. They differ from another less powerful defensive system originating in the bone marrow, the ordinary leucocytes or polymorphonuclears. In the organization of the reticulo-endothelial system it is impossible not to see deep social analogues in the police, the seamen, and soldiery of a nation. And even in magistrates and the high judiciary. I do not propose to deal with these analogies at length, but there are a few which bear particular examination. That the social police may be so greatly occupied with one disturbance that they are unable to deal with another is easily understood. The constable with a prisoner in custody will not attend to his ordinary duties. The cells of the reticulo-endothelial system may be in a like case. They can be so deeply engaged in removing an injected dye as to be incapable of attending to more serious matters. They often exhibit the character of a specially armed powerful police. The ordinary leucocytes and polymorphs are, it seems, quite able to deal with the *Bacillus tuberculosis* when they meet it *in vitro*, in a laboratory test-tube. Perhaps the conditions have disarmed this bacillus, for it is found that in the body it is far too much for the leucocytes, which positively decline to handle it. Nor can the lesser reticular cells do so. There are, however, large mononuclear cells known as macrophages which can 'arrest' what all other police cells cannot touch. These phenomena have a great and even dramatic interest. They show that societies and animal bodies develop continuous and varying lines of special and unspecialized defence. This defence in the animal organism is by no means altogether against outside invasion or even the infective cells which are always found in a healthy body, for the reticulo-endothelial cells act continually as somatic scavengers by breaking up and removing tissue

damaged or killed by inflammation or accident. The cell known as the monocyte is peculiarly predacious. *In vitro* it is found to take on the role of the macrophage. But what is more interesting is its capacity on occasion to consume blood-cells, and what is more remarkable, even granular leucocytes themselves. If this does not suggest cannibalism it may at least suggest the arrest of a constable by the military. It must seem to students that this ruthless handling of damaged and dangerous cells of all kinds is a sounder evolutionary method than that of a social organism which, by a peculiar weakness of its proper defensive system, preserves protoplasmic units and tissues which are clearly detrimental to the nation. How far politicians and the medical profession can learn from such phenomena is difficult to say, but I infer that, as both these great orders of social agents themselves properly belong to the social defensive reticulo-endothelial system in its present low stage of evolution, they may yet learn much from the more reasonable and consistent somatic system, which does not exhaust its energy in preserving what is dangerous to social immunity.

CHAPTER XIX

IMMUNITY IN ORGANIZATION

IMMUNITY IN CONSTRUCTION. So far little has been said, though much has been suggested, of the part immunity or immunization plays in the growth and balanced construction of the animal and social bodies. Yet all that has been remarked of hostile and sub-hostile action between organic parts and the tools or weapons which these use must finally be referred to immunity as the result of bio-chemical balance. After what was said earlier of the 'grudging' agreement among organs when unstable peace is kept with difficulty, we must see that bodily endocrine balance is not mechanical, though we may have to treat it as such in practice, but the result of highly complex chemical secretions which stimulate or inhibit all the parts in turn. That the way in which the tissues act on each other is by what can legitimately be called the administration of drugs has been made obvious by Dale, who demonstrated that the sympathetic system works with adrenergic, a chemical product related to adrenalin, and the parasympathetic by 'giving' acetylcholin. To what extent like drugs, in a nascent state as the result of fresh combinations, act on the whole of growth is not yet even guessed at. But all that is known shows these remarkable bio-chemical factors as the basis of somatic stability. The subject of intra-organic immunity is seen at once to be relevant to inter-organic or international immune balance. With this we approach political and military balance from a fresh angle. We ask how it comes about, how it is maintained, and why it breaks down. A politician with the notion of immunity as a weapon of analysis will see that he

is always dealing with cases of increasing or decreasing national tolerance implying action and reaction which depend on what in glands are secretions and excretions but in nations are their imports and exports and the immediate and mediate effects of any stress each puts on more or less hostile neighbours. The action of a national press as a powerful secreting organ needs no demonstration. To say this is not illicitly to introduce psychology into a biological problem. If a confused array of psychological arguments, or insults, can be demonstrated as the result of social physiological, or pathological, reactions, there can be no objection to their being noted as phenomena. The student of political biology should study national mass attitudes and their results as if they were actual secretions or excretions. National or international repulsions may rest on little. To put the matter at once on the lowest physiological level, it is well known that the smell of one race may offend another race as much as or even more than different habits and customs. There are marks of differentiation which suggest avoidance and caution, even aggression and insult. Whatever may be said for international friendship, it is easier to account for international hatred, dislike, fear, or contempt. We need not look on these as psychological factors; they are in the mass the results of biological and even bio-chemical differentiation. It is easy to see that separation at once initiates a condition in which immune reactions come into play. A race that smells different is different, and even a slight bodily odour due to habits of nutrition and cleanliness may excite open hostility. An excessive use of garlic has been known to cause social uproar. For lasting tolerance of racial odours, such factors of disruption must be made endurable by a process analogous to immunization. Fortunately, however acute the olfactory nerves they are soon blunted. These marks of difference may seem trifling to curious anthropologists who seek for larger marks of differentiations, but they are often of

far more importance in the mass than slight differences in bodily structures. I am not aware whether it has been noted as a strong argument in favour of the Darwinian descent of man that masses of unclean humanity herded in a building have an odour which is powerfully and most convincingly simian.

CLASSES AND TOLERANCE. It should have been made clear enough when status was under discussion that international processes of an immune order proceed intra-nationally. The establishment of class repugnances tends, when reasonably held, to stable social construction by forbidding that inter-class familiarity which is always likely to lead to misunderstanding instead of that social biological equality of which the more ignorant politician, dissatisfied with his own status, is apt to speak. The sound inference to be drawn is that if even nationals have to be rendered tolerable to each other by inhibitions, instinct, or express and implied regulations, similar processes must be gone through by nations as they try very cautiously to get on social terms with their neighbours. Such approximations may end in unexpected explosive results. Little is yet known of the bio-chemistry of nations in tentative community. To speak in grosser terms we may reflect on national and international trade as the exchange of products which must be got rid of by the producing agent unless it is to be inhibited from action by the very results of its excreting powers, just as the products of a ferment finally stay fermentation. Such production may lead to dangerous irritability among nations. To say that what look like simple trade inter-organic and economic processes are yet understood would be untrue. They are as hard to define as inter-glandular reactions. But there must be relative tolerance and immunity if disasters in international constructive relations are to be avoided. To say that immunology should be the favourite study of foreign and home ministers is scarcely going too far. Few can doubt that some

slight knowledge of it by politicians who endeavour to anticipate possible evolution by urging irritable nations into dangerous social relations, might save much international anxiety. The same might be said of those who recommend the immediate abolition of the social class distinctions by which all complex societies exist and do work. In all such relations, in the conflicts which are hostile or merely sub-hostile avoidance, we can find all the conceptions familiar to the immunologist. Their political significance will be found in the recognition that where immune balance goes, finally there will be the political death of one part or many. In the international area there will be the incursion of a healthier and more powerful neighbour with dangerous concomitant results. That the evolution of nations proceeds thus by immune failure needs no proof. It is also clear enough that the international survival of the fittest may mean the forcible extrusion of a civilized race by a culture of a lower order. It is easy to infer that more admirable and effective types of man might have evolved but for some failure in the capacity of one nation to tolerate a disagreeable neighbour. Toleration may be the sole resource of the weak. Our ancestors probably destroyed Neanderthal man. That greater-brained race might have dominated a philosophic and vegetarian world. We may console ourselves with the reflection that human beings might have been even worse than they are, with more powerful capacity to remain immune in a more savage environment. This may, indeed, be suggested by the phenomena disclosed by excessive or failing endocrines. There is no reason that these organs should not have constructed man of a myxoedematous or acromegalic type, since myxoedema and acromegaly are seen in modified and arrested stages where a degree of static immunity has been reached.

THE REACH OF IMMUNE THEORY. It is impossible to discuss the whole range of analysis open to immune theory as

a weapon of proof and discovery. I have not ventured even to touch on such interesting subjects as active and passive somatic immunity. Yet I cannot pass them by without applying both conceptions to the social organism. For the sociologist civic awareness of social danger and a readiness to meet it is 'active' immunity, while the introduction of hired mercenaries and alien police accustomed to deal with inflammatory social phenomena, constitutes 'passive' immunity. That this method is fraught with danger is well known even to the politician who has never studied Machiavelli as it is to physicians who apply prophylactic and therapeutic sera in threatened and acute disorders. That we may apply immune phraseology to labour disorders should be at once obvious even to the hopeful student of society who looks forward to the time there will be none. Yet here I remark that one great hindrance to scientific investigation lies in the fact that few deeply interested observers find it easy to conceive that what they are themselves familiar with can be a proper object for science or even a question at all. This reluctance, comprehensible to the ignorant, is encouraged by the text-book attitude of mind which teaches that science can deal only with the How and not with the Why. I hesitate to ascribe this peculiar belief to the intense reluctance many scientific workers have to acknowledge that any problems of theirs can be simplified or 'explained' by reference to a science with which they have little acquaintance. Yet obviously the How of a superior inclusive science is the Why of sciences subordinate to it. For all the sciences work together as an organic engine of discovery. It may be inferred that the instructed sociologist who recognizes that, *ipso facto*, he is a student of biology, will find in labour-employer problems all the phenomena discussed in this chapter. He may in the end come to think that knowledge of immune theory might have been of great value to the more rigid and dogmatic political economists. In any case

have no hesitation in affirming that the wide functions signed to immunity do not by any means cover the great field in which its factors are to be found at work. Whatever units are allotted to immunity in current medical or physiological theory and practice, all its weapons and tools come from the natural arsenal by which each separate cellular unit of whatever order and each combined semi-autonomous part is furnished with means to defend their status and future evolution. We now see immunity as a great general measure of physical and political health. To possess it is the mark and proof of attained differentiation and balanced construction. The need to restore it is therefore a measure of ill-health in social and somatic organisms alike. After restoration the *status quo ante* is rarely restored. Langdon-Brown remarks that some nations find themselves more 'comfortable' on low evolutionary levels. But the new state may be stronger if stress has called out adequate repair. There will be new periods of endurance, new gradual efforts for tolerance. Without the restoration of working immunity there will be disorder, anarchy, and finally the complete de-differentiation which is social, political, and somatic death.

TOLERANCE AND THE HEBREW. If any thoughtful student of world affairs and world organisms were asked to apply these conclusions to political phenomena as biology, he could scarcely avoid studying, and perhaps understanding, some present problems, to most of which I have not alluded of set purpose as likely to disturb scientific calm and mislead the judgment. I say 'perhaps understanding' because it is unlikely that they will be understood so long as political passions and prejudice cloud men's perceptions. For though the historian may rightly permit himself pity and indignation, these passions have no place among biological arguments, in which, in all pure science, the worker must take the attitude adopted by Spinoza: '*Sedulo curavi humanas actiones non ridere,*

non lugere, neque detestari, sed intelligere.' Whether Spinoza, even though self-exiled and expelled from Israel, would have easily preserved this philosophic equanimity in view of active and vehement anti-Hebraicism is not easy to determine, but that need not interfere with a short inquiry into the reasons Hebrews have never been able to induce full tolerance in any country. In a previous chapter I gave a hint as to the possible solution of this question, and what has been said of nutrition may assist. The Jews are a fully and completely differentiated, or pandiaccritic, race, wandering as 'foreign bodies' of peculiar, inalterable, and easily recognized characteristics among comparatively undifferentiated nations, to the Hebrews almost barbarous, which dislike strangers and most especially dislike those with marks that set them apart. That nations which thrust them into ghettos were actually 'encapsulating' them as foreign bodies isolated in the 'fibrous tissue' of a prison, is on these lines easy to understand, although from the Jewish point of view the walls of the ghetto might be looked on as a protective cortex. An element rejecting the half-way house of compromise which is tolerance could not secure complete immunity from the environment it invaded. The Jew, in fact too deeply differentiated to be assimilated, has rejected any step to assimilation or de-differentiation by banning all intermarriage with no less rigidity than that displayed in the United States against marriage with those of negroid blood. There has been therefore no safe ground on which to establish sufficient tolerance to avoid the phenomena inevitably associated with any struggle for immunity, though the Jews seem incapable of seeing that on scientific principles a non-immune intolerated body must be ejected, immured, or remain likely to cause social friction and disorder.

ASSIMILATIVE POWERS OF THE ENGLISH A POSSIBLE WEAKNESS. It is illustrative of these analogies in immunity that certain nations have less objection to the Hebrew race

than others. This is capable of explanation where it is obvious that nationality and nationhood have been built up by many immigrant elements. The comparatively genial tolerance of some nations is thus a biological reaction. In England there has not been for long an anti-Semitic movement sufficiently strong to cause great social disturbance. When speaking of certain physical phenomena I showed that nearly all solutes lowered surface tension. Undoubtedly the surface tension of a race may be high or low, and, though it is difficult to raise, it may be lowered easily. It is no mere illustration to say that every new alien admitted by way of peaceful penetration renders it easier for others to follow. The English, though well differentiated and on the way to become a race if their surface tension is not further lowered, are curiously tolerant and of great assimilative capacity. If they cannot assimilate the Jews as a body, they have as a matter of fact digested many and have on their side acquired a remarkable tolerance for those they cannot alter. And yet there are certain apparent prodromal symptoms of a change in this respect. I refer to the peculiar explosive phenomena of anaphylaxis. It is undeniable that the late influx of Jews into England has resulted in reactions which seem remarkably analogous to anaphylactic shock. I regard it as impossible not to own that such analogies have a real basis in the fundamental phenomena of immune reactions.

CHAPTER XX

SOCIAL GROWTH AND OVERGROWTH

CONTROL OF ENERGY. Reasons were given earlier for distrusting schemes implying the complete ownership by the State organism of its main working parts and its fixed or fluid capital. In biology there is no ownership beyond that exemplified in the cell and its nucleus. As the exercise of the cell tools is controlled by the immediate and mediate environment, so it should be with the state itself. We cannot define the state except as its parts which are also thus controlled. In any case to define ownership to every one's satisfaction is beyond the power of lawyers themselves. To own capital energy is to control it, and no physiologist could possibly approve of a scheme for transferring that control to an *ad hoc* body of officials, detached from what had been the governing morphogenic environment. Nevertheless it is obvious that there must be in a developing organism a growing apparatus for controlling the use and allotment of energy. In this section we may deal rather with examples of its waste and misuse, which might engage the energies of sociologists and politicians as a preliminary educative task to controlling it in its greater social functions. These functions have their biologic history: they grew by processes of trial and error, and, though often grossly mishandled from the ideal point of view, no one doubts that they must be adequately energized. I shall now speak of growths of which that cannot be said and would not be said except by those who depend nutritionally upon them. In an earlier chapter, when the origin of institutions and business firms was touched upon, it was shown that there is a natural

exuberance of tentative constructive variations in a social organism with abundant energy. Most of these variations perish: nothing results from them but waste. Yet some succeed and are in their way useful. Others succeed in nothing but the continuously increasing parasitic subtraction of social energy. Biologically these are protoplasmic efforts to build wild structure: pathologically they are tumours, or overgrowths without a properly physiological function. Politicians and sociologists can have no difficulty in thus classing numberless parasitic and semi-parasitic social growths, most of them largely devoted to the charity which begins at home, that is, in the head office.

THE NATURE OF OVERGROWTH. Those who have studied even casually a large range of animal life such as can be found in a natural history museum, must have noted, not without surprise and wonder, the capacity of protoplasm to construct more than physiological economy might suggest. The failure to understand this onward inertia of active growth has forced many zoologists into a corresponding overgrowth of explanation. To say that living protoplasm when properly energized can overdo things and in fact go wrong, is even now near to unorthodoxy, but it is certainly not so heterodox as it was a little time ago. There are, however, still a few resolute adherents of the view that all growths, extravagant, redundant, and visibly hampering, have survival value. A palaeontological museum should correct such opinions. If every variation accepted by a species was of survival value, why did these monstrosities not survive? Why should any dominant species perish? The sceptic may be excused for thinking that these questions of variational growth and overgrowth *praeter necessitatem* are not easily solved by reference to the text-books, especially if he remembers that text-books are specially constructed to enable students to give answers agreeable to acquired characteristics of elderly examiners. He may e

see reason for believing that, unless directly inhibited and controlled, there is in all animal life an endocrinal tendency in the parts to go on growing which is likely to end in want of balance, asymmetry, and finally in harmful overgrowths and extinction. This is the inertia of protoplasm. Zoologists can point to many examples, notably the Irish elk with a ten-foot spread of antlers. It may easily be imagined with what timidity I hazard the suggestion that in any case antlers are a useless outgrowth, since all deer-stalkers know that the hummel, or stag without them, is a better fighter than his armed rival. But overgrowth has many aspects. If, as I suggest, it happens in phylogeny it can certainly do so in ontogeny. Fibrocytes may mend or go on to overmend. Repair overdone may destroy an organ. Physicians will recall examples of misrepair. That a genus or species may so suffer from phylogenetic over-repair through inertia may not yet be admitted by all students, but I propose to suggest, and possibly to prove, that many such quasi-advantageous variations most decidedly endanger, cripple, and possibly destroy, great social organisms.

GROWTH AND DRAFTS ON ENERGY. In a particular inquiry regarding societies there can be no great advantage found in carrying these suggestions much further. Overgrowths of the parts, with loss of balance and misdirection of energy, are clearly likely to happen. It may be said they would invariably occur but for the automatic resistance of the parts against any deprivation of their usual energy and nutrition. Nevertheless if overgrowth can take place in a high-grade organism such as a mammal it is obviously more likely to occur in a low-grade one like a society in which there is continuous budding with new experimental parts. If, with central control such as that reached in social organisms of the national type, overgrowth of established organs can still occur, it is no physiological wonder to observe entirely new growths running into gross excess of structure, with a socially dangerous misuse of energy, which

must be looked on as social tumours. They are mostly 'innocent' in the social physiological sense but definitely harmful by the abstraction of energy needed elsewhere. Their innocence consists in their being not immediately and directly destructive. These phenomena propose severe problems for the philosophers who are able to believe, apparently without strain, that the whole organism works itself out on a teleological basis. They should, however, not disturb the biological student who notes them but refuses to avail himself of the limitless resources of personal psychology and metaphysics not under organized control. It may here be remarked, not wholly as a side-issue, that many biologists find themselves totally unable to distinguish the doctrines labelled with 'The Organism as a Whole' from a morbid growth in metaphysics, perhaps analogous to the innocent tumours in question.

ENERGY DEMAND AND NEOPLASTIC GROWTH. In a study of this order it is hard to avoid repetitions. But it is as well known to teachers as it is to their disciples that a surplusage or overgrowth of explanation is often very welcome. I do not hesitate to repeat what has been said about energy, growth, and central control or the want of it. Much when put into plain biological language can be translated at once into terms of money and building. With central control the money comes from definite sources. Where there is no such control, as in cases of charity associations, neither the sources nor the allocations of the energy may be known. The results are often scandalous and even socially dangerous. From the point of view of national nutrition in the very widest sense there should be a public department definitely devoted to the economic superintendence, taxation, and control of the social tumours in existence and of those which seek daily to establish themselves in public sources of supply. Apart from such neoplasms there are, however, well-established social organs or

structures which absorb energy and practically resemble those charitable institutions in which the staff is the prime and perhaps the only consideration. The inertia of demand in continual action may still be seen at home in Government departments which are politically and functionally dying, although actively alive in the economic and nutritional sense. Like phenomena occur inter-departmentally where traditional and practically obstructive official customs survive. These customs may be actually dangerous. To show analogies between a disordered appendix and a useless surviving office is not difficult. Some offices become as parasitic as a tumour or as a congenital malformation which they have come to resemble. They cannot be abolished without disturbance. It will be inferred that new growths arising from the vigorous normal national tissues are liable to increase rapidly and dangerously, as they have no traditional or endocrinal control. They may starve the organism on which they are parasites and yet are not technically malignant or invasively destructive. We shall have no difficulty in finding social growths or institutions of this order. There is little doubt that the 'protoplasm' of such growths will protest that they are benevolent and biological. Any grouped functioning set of unit cells securely anchored on sources of nutrition is likely to take that security as proof of its value. A tumour in full growth may be said to have a warm sense of its virtuous activity. The same might be said of growths which, resenting irritation or interruption of supply, become invasive and malignant. Protoplasm has a ruthless passion for growth. If to this we owe life we owe to it many disasters.

RELIGIOUS GROWTHS. It will be asked what social institutions can be looked on legitimately as innocent tumours. This question should be fairly easy to answer since, on the view expressed about construction generally, all and every piece of new construction resembles a tumour in its want of order

and organization. There is no need to enumerate the well-established growths accepted by the social organism, although grave reasons may be offered for thinking some of them now parasitic. They may be defended on the ground that the energy they absorb is in part at least devoted to work done in the country of their origin. I shall therefore rather select one or two calling for more particular examination which spend energy and the money which represents energy in other places. These should be of particular interest not only to politicians but to social physiologists and pathologists; all the more, perhaps, because even the soberest consideration of such growths is apt to excite passions subversive of clear thinking. But the highly complex instincts of religion are so essentially organizing and organ-forming that they cannot be neglected even in the most casual biological sketch of national organic growth. Yet few sociologists have regarded religion with a detached and purely scientific mind. They have rather left the subject to historians, who notoriously lack scientific training and therefore defend or attack it according to their prejudices. I propose to do neither, but shall examine some of its phenomena which cannot be conceived as strengthening a national organism. This can be done without denying that creeds have played great parts in the making of nations, though they may in many cases be regarded as a sign of the welding rather than the cause. These, however, are major historical problems which are not directly capable of biological treatment. I shall not even inquire seriously whether the churches as social organs are now functioning to regulate and stabilize social metabolism, though this has been their most important task since religion, as a corpus of doctrine and tradition, was established in alliance with a national government. This may be doubted, especially in a country in which tithes, a direct abstraction of energy from the land, can be regarded as strictly parasitical. I do not, however, regard a

church of the national order as a morbid growth. It is a remarkable organism and, when considered by itself, a proper subject in which to study all the phenomena characterizing growth. There are, however, religious institutions which approximate to true morbidity, especially where the civil power has compromised with their pretensions by allowing them to hold in mortmain all they could grasp. So far a church may be regarded as more or less 'innocent,' even though morbid. If, however, it develops machinery for terrorizing and even killing its opponents it should be classed as malignant. Of such growths something will be said later, when social malignancy falls to be considered.

MISSIONS AS TUMOURS. When examining societies with a view of discovering pure social examples of neoplastic useless growth, the organizations controlled by charity naturally suggested themselves. I was, however, compelled to reject even the worst cases, for they obviously did a little work in the organism on which they fed. The search for organizations which exhausted money and social energy and did nothing for the nation from which they drew it was at last directed to the fertile field of foreign missions. These seemed to offer at once all the requisite marks of unphysiological social growths which could legitimately be described as innocent tumours. They afford, indeed, the most beautiful examples. Undoubtedly these institutions abound and flourish on energy which could be directed with social advantage to ameliorating pathological conditions in the national organism in which they originate. It may be said that their function is one of which biology cannot treat. The pure biologist, however, is very definitely interested in all structures, and the scientific impartiality to all forms of belief which is incumbent on him by no means relieves him from estimating the actions of religious missions as consumers. If on the plainest grounds he comes to the conclusion that some religious institutions are

obviously parasitic he is bound to remark it. There is another aspect of these particular missions which is not so obvious as their social parasitism. It shows clearly that innocence and malignancy may be relative. For, if the essence of 'innocency' in a growth is its lack of power to invade, break up, and consume other tissues, it seems that growths innocent nationally may yet invade the world as an organism and be very definitely malignant in their destructive international relations. This is recognized politically in the invasive processes of trade. Missions have important political as well as biological and pathological results as they break up ancient tribal life and physiology without replacing what they destroy by adequate structure, an impossible task. I refrain from remarking at length on the biologically absurd notion that a fresh religiously imposed set of alien rules can replace a morality which has grown up during tribal history. That these phenomena come within the natural purview of the social pathologist cannot be denied. Nor can it be doubted that they throw a strong light on somatic malignancy, as I have elsewhere argued at length. Those who reflect on missions may perhaps reach the conclusion that they should come under strict Government control on national, economic, and nutritional grounds.

EDUCATION AND OVERGROWTH. So far nothing has been said directly of overgrowth beyond social needs in governmental departments. That these compete for energy and would overgrow if possible is clear. I am aware, however, of only one which is continually absorbing more social energy and using it not for the good of the national organism, but to its detriment. This is the department dealing with education. I shall not treat the whole subject of training, but the mere mention of the word suggests that what is known as education is not training at all in a biological sense. For what a nation needs is biological education. By this I do not mean instruction in biology, since the vast proportion of workers must

remain essentially incapable of science, but training on biological lines for the social functional work they as masses are destined to perform in differentiated tribal distribution. But now we have no tribal education beyond that found in the playing-fields, which is in most cases infinitely more valuable than that given in classrooms by teachers whom no educated man considers educated. The results they get do not help on useful differentiation but tend to disorganize that naturally existing by reducing their pupils to a common level of comparative incapacity. The natural healthy and biological tendency to the caste system is checked and modified by treating the mass of those taught as if they were to be always of one class, a notion which I have shown is rejected indignantly by the 'lower classes' themselves. Cobbett said truly enough that there were as many kinds of men as dogs. To treat all alike is absurd, for such treatment unfits the average individual for what he might do well and attempts to fit him for work he is unlikely to obtain and could not perform if he did. In the meantime the organized overgrowth of massed teachers demands even freer access to the sources of energy in order to hypertrophy still further a morbid social disintegrator. It is not my purpose to say what should be substituted for education as we see it. It might be thought that the deep-seated instinct in the young and in the large majority of all classes against formal education of any kind had a sound defensible foundation. That this instinct exists should force at last an early class training for classed work on the lines indicated by the actual immediate needs of the social organism and the definite differentiation of the social body. I have little more to say of the physiological origin of this pathological social overgrowth than that its protophase is to be sought in early church schools which took into account a reasonable measure of class differentiation. The social physiologist must now inevitably regard the whole institution as parasitic and not too obviously innocent.

RELATION OF HISTORY TO EVOLUTION AND DISORDER. Having got so far, if indeed they have travelled with the argument, the young historian and sociologist should be in a better position to understand the action of the schools and churches in their efforts to monopolize power and social energy. But historians, who almost universally condemn the notion that science could in any way help them to sound conceptions, have almost entirely ignored the principles of social growth, with the possible exception of law, in which it could not be neglected. But law is the skeleton of a social organism and its study the study of anatomy. The general theory of evolution since Darwin's time has no doubt stirred the driest dogmatic dust even if it is hard to observe signs of its work in the main *corpus* of history. Even so it seems possible that its students may yet awake to the help science can give them and find assistance from such special sciences as I have here called on. The main and simpler principles of growth and the inertia of growth may help the younger students if the historic art and craft of the elder brethren still retain in secret the doctrine that history is but the elder brother of fiction and pleasant narrative. There is no doubt that there is no physician, physiologist, or pathologist, if led to the subject carefully, but would recognize in the phenomena of history aspects of natural growth and malformation with which he was strangely familiar even in their unaccustomed garb. I should not despair of his seeing at once much that would remind him of the conflicts, victories, and defeats of embryonic growth, for in the social organism he would have been brought face to face with the like a thousand times. Innocency and malignancy as social phenomena might for the moment surprise him, but very little thought would reconcile him to such a conception. If it were added that under favourable conditions it might be possible to discover a bishop who would discern similar phenomena in clerical growths, that might be going too far.

On that I shall say no more than to repeat without apology that the struggle for ecclesiastical power and the revolt against it resembles in all its prolonged course and symptoms something that pathology could take cognizance of. For if all the main phenomena of evolution are to be looked for, with the certainty of their being found without prolonged search, they can be sought in the organic life and institutions of the churches and in their growths and overgrowths. The conclusions to be drawn by those whose function it is to preserve social balance and metabolism are too simple to need mention the moment it is recognized that what the active social units of one social organ would consider signs of its own health may in fact be a grave indication of its danger to the greater social organism of which it is part. For an innocent growth may starve its host to death.

ARE THERE SOCIAL 'MALIGNANT' GROWTHS? I propose in the following pages to offer some suggestions on a subject so far merely hinted at. If there are innocent social growths, are there also social conditions analogous to true somatic malignancy which bring about changes that cannot be interpreted as merely the morbid or disturbing side of breakdown and repair, but threaten a present and perhaps catastrophic disaster to the national organism in which they are found? I have little doubt that in the case-books of history there are many such phenomena, even though their proper nature has not been recognized.

CHAPTER XXI

DESTRUCTIVE OVERGROWTH

ABNORMALITY NOT UNNATURAL. It has been demonstrated that abnormalities in the social somatic body are not unnatural. They are reactions to unevolutionary stimuli from the internal or external environment. On these lines the nature of social growths when distinctly not anarchic or destructive is comparatively easy to understand. In fact, we may say that the main difficulty lies in the way exuberance of growth is generally controlled and inhibited. This inhibition, however, is seen to depend largely on the partition of energy. Yet those who are ready to accept these notions of growth and overgrowth of the simpler or more innocent order may find it much more difficult to believe that there is to be discovered in the lower-grade organisms, to which nations or societies belong, anything analogous to, or even highly suggestive of, cancerous processes in the high-grade mammalian body. It is therefore necessary to make the nature of these diseases, as exhibited in the behaviour and habits of somatic cells, as clear as possible. Otherwise we can have no ground for predicating anything essentially like social cancer.

‘MALIGNANCY’ A MISLEADING WORD. I am tempted at last to make a protest against the very word ‘malignancy,’ often as it has been used here. It is assuredly misleading when we deal with cell and tissue relations to employ a term which has such psychological connotations. It may be a matter of even greater importance in this analysis if anything like social cancerous processes be demonstrated. Should they exist, the social units concerned must be human beings, and to dub

them malignant while studying the causes of their action would scarcely befit those who accept Spinoza's views on the actions of men. The term 'malignancy' has, in fact, had a great influence on the general theory of the invasive tissue diseases, and undoubtedly a very bad influence. Its use has helped to strengthen the notion that there is something unutterably abnormal and unnatural about invasive epithelium. As I shall show presently, the whole series of these diseases must be classed as developmental disorders which might be looked for by those who knew something of the construction of the mammalian body. For the glands, including the skin, are created *in embryo* by epithelium, a tissue naturally invasive till stayed by balanced growth. To put it now shortly and dogmatically, there is every reason to believe that cancer tissue and cells are always 'doing their best' to be normal. Thus if 'malignancy' is seen in the social organism we shall not instantly and without analysis or consideration blame the social units concerned as if they acted causelessly through peculiar and abnormal motives. This is the more essential because in such conditions as I shall indicate there are too frequently let loose individual criminal instincts, likely to excite horror and indignation, which have no real causal connection with the social movements concerned. Thus rapine, arson, and murder in a revolution can always be shown as incidents, and not necessary incidents, in a movement the protophase, or earliest beginnings, of which might easily be discovered in a distant century. If I were to draw a political lesson from such lamentable accidents it would be a premature attempt to show that these great destructive events ought never, in the political sense of the word, to be necessary. But how far social and political theory may avail in the direction of biological events should presently emerge if it was not made plain in the section which dealt with the intellect in evolution and the limits of human wisdom.

IGNORANCE OF SOMATIC ZOOLOGY. It seems almost beyond belief that nearly all theories of invasive disorders have been put into circulation, and text-book dead-houses, with very little knowledge of what may well be called the zoology and natural history of bodily cells. In the vast bulk of the cytologies it is difficult to find anything about their customs and habits as living 'individuals' which have to seek enough food and oxygen to live on. With a better knowledge of tissue culture and with lively means for showing that cells are 'creatures' apart from dead diagrams, it might have been expected that at least a few pathologists would have turned field-naturalists in this branch of nature-study, but so far as my reading extends I have come across none who seems to have the faintest notion that a hungry cell may become as much a ravaging beast as a hungry tiger. There is no doubt that hungry or badly fed epithelium has no regard whatever for law or order or inhibition or protecting frontiers when its commissariat fails. If we can learn how the settled laws of the somatic community are thus overthrown we shall have light thrown not only on actual invasions of one state by another but upon all types of violent revolution in which one class, breaking loose from ancient inhibitions and normal control, destroys, or tends to destroy, long-established social constructions. In these at least there is no doubt that the protoplasmic units concerned are something more than historic diagrams.

SOCIAL UNITS AND 'SIMPLE' CELLS. It must seem to some an unjustifiably imaginative step to take when it is implied that masses of human beings strikingly resemble such things as 'simple' cells. But there is no such thing as a 'simple cell'; the humblest is of unimaginable complexity. There is nothing with activity, however small, which we are justified in thinking simple. It is true that physiologists take the cell unit they work with as simple when compared with

the complexities they try to explain. They leave the cell's complication to the imagination and the microscope of the cytologist who, having theorized on the chromosome mechanism of heredity, and speculated vaguely on Golgi's apparatus, of which as much is known as of the glands of Swammerdam, that is, exactly nothing, neglects the cell as a vast historic city teeming with protoplasmic units armed with enzymes and catalysts and all the elementary passions of life. For there is, without entering the majestic region of benzene rings and electrons, reason to reckon cells relatively as complex as man himself, and as infinitely more different among themselves than the most alien of mankind. And their numbers in one live animal are beyond calculation thousands of times more than the world's human inhabitants put together.

SOCIAL AND CELL CANNIBALISM. It is true that a few investigators have shown a lively apprehension of cellular life and even of cellular passions. Such deserve to be recorded in something more than the dead dust of a bibliography. Ray Lankester wrote, when speaking of the egg capsules of *Gastropoda*: 'In some cases all the eggs in a capsule develop: in other cases one egg only in a capsule (*Neritina*) or a small proportion advance in development: the rest are arrested either after the first process of cell-division or before that process. The arrested embryos or eggs are then swallowed and digested by those in the same capsule which have advanced in development.' We even learn that in the normal human body 'the scavenging of dead, dying, and damaged tissue is a task in which the macrophage delights.' This recognition of the passions of the reticulo-endothelial system is worth noticing since it is not merely the invaders with which its fixed and wandering cells deal but just as readily the dying red blood. I am the more disposed to insist on these phenomena because physiologists themselves and even pathologists have been reluctant to acknowledge that intra-organic cannibalism is a

great common feature of normal life and that the lytic, or dissolving, weapons which predatory cells use are a fundamental property of embryonic cell life. It is, then, a matter of wonder that this reserve capacity of destruction in the epithelial cell has not been readily recognized when abnormal conditions have called it into play. But we may remember the stubborn resistance of many anthropologists to the obvious truth that cannibalism has been a great factor in human evolution.

CELL LIFE AND POTENTIALITIES. If so much is said of cell activities and powers, which seem more and more obvious the more the phenomena of combined action are analysed, it is in order to emphasize the fact that there are greater resemblances between the massed units of human society and those of man's body than might otherwise appear credible. There should be little difficulty now in seeing that in the tropisms and forced activities of the body's cells are to be found the source of the powers and passions of humanity itself. The power of the cells, when ordered and regimented, is the source of human energy. It is, no doubt, easier to get this across the table to the student when psychological imagery is used about cell life. Indeed it is difficult to avoid using it, though its dangers may be minimized by the reflection that the psychological interpretation of man himself as a unit is equally dangerous in science. It must be admitted that the general view of cell and human life suggested will be so supremely disagreeable to many that they will at once refuse to entertain it. But to these a demonstration in anatomy might appear shocking, to say nothing of a tissue growth film of savage phagocytes. And now perhaps we may return to what actually happens in cancer when the epithelium starts invading its commissariat tissue and finally destroys the body of which it was once an obedient, if potentially rebellious, member. If such phenomena when briefly described can be paralleled even loosely in political revolutions something has surely been gained. If

we cannot soon cure bodily cancers or social anarchy it may still be well to understand them. And for that purpose the imagination should not be without its uses. It is true that even its legitimate employment has before now ruined or threatened to ruin many who used it with good results. This not all need dread and if I can incite a few students to turn hopefully to the natural history of cells working in community and leading lives of which we know so little, lives perhaps as relatively long to them as ours to us, lives that have their natural happy and easy functions, their prolonged miseries, and their dramatic catastrophes, I shall be content whatever is said of the issue.

DRAMA OF CANCER. What then is the drama of cancer? What, to use the phraseology of Aristotle, are the seeds, what the growth, what the climax, catastrophe, and close? It may seem strange to use these classic terms of the tragic theatre of the Greeks for the tragedy of cancer. But perhaps Aristotle as the critic of the drama saw how he might employ such terms in his studies of disease, though he missed the conception in his *Politics*.

CELLULAR 'PREFERENCE' FOR NORMAL TYPES. The politician who believes that a serious and deadly struggle on a frontier can arise suddenly without a long series of warning incidents is scarcely one to be put in charge of foreign politics. And yet, since we have to imagine cancer coming into existence at a particular point of a frontier, it is not difficult to imagine that even members of the medical profession think it may come about suddenly, as it were in the twinkling of an eye. Quite lately it was stated in a prominent medical paper that normal cells could thus become quickly malignant. A very little thought and knowledge shows that the malignant cell in one very great sense remains normal, or as normal as it can be if the environment disturbs what should be its normal life, development, and death. This the phenomena will

themselves demonstrate without prolonged argument. That it should be demonstrated is of the utmost importance in the social analogies and implications which cling about the conduct of the unit in social and somatic disorders of all kinds.

THE STUDENT AND CANCER. I shall make no apology for such a short study of this disorder as I conceive useful and in doing so shall ignore the popular view, far too much encouraged by many medical men, that cancer is more a mystery than most diseases. If, as I hope to show, there are definite social destructive conditions of a remarkably like order, we shall at least have advanced to the conception of social cancer, which is what I wish to make plain. The young sociologist and politician, who should be social physicians in the making, ought not to resent being encouraged to seek help even in the wards of a hospital. If they have by this time assimilated the profound truth that all disease, even cancer, is as 'natural' as normal health, they will be all the more ready to learn something of the actual phenomena among which social analogues may be found. I shall therefore now show more or less roughly what happens when the epithelial or living and glandular tissue of the mammalian body becomes invasive. For this is the essence of cancer. It needs no theory to explain it. But a hundred theories can confuse it.

THE NATURE OF CANCER. Whatever the antecedents of this disorder it soon appears that an important one is such an environmental condition of the epithelial cells that they cannot lead their short normal life which ends by their dying a normal death on the outer surface of the tissue to which they belong. These cells arise by cell-division in an inner undifferentiated or neogenic zone lying against the connective tissue. On division one cell moves up from this zone to take its place in the working tissue: it retains no power of division. The other cell remains behind to divide and repeat the process. The

immense epithelial waste of the skin is thus continuously made good and its outward protective value preserved by the cells slowly keratinized, or made into horn, which are thrust towards the surface. This keratinization is a normal process due to the progressive removal of these rising cells from their original source of nutriment brought by the underlying connective tissue. They have no apparatus for feeding themselves and in ordinary conditions are totally dependent on the connective tissue and its lymphatics for food. Epithelium has not even its proper blood-supply to bring oxygen. It resembles those ants which are fed by slaves. We can thus call the supply tissues the slaves of epithelium and a remarkable picture of social cellular life should now begin to emerge. For what happens if the slave cells fail in their duty to the neogenic zone? I do not know if slave ants are at last eaten by their lords if they fail to do their work, but assuredly the slave tissues of epithelium are the first to suffer when the master tissue cells are not fed.

DISEASE AND 'WICKEDNESS.' This simple zoological diagram of cancerous processes is by no means universally accepted. But there is no need to theorize behind the actual facts. What can be seen in practice with and without the microscope affords good grounds for simple social analogies. For in drawing them theory does not matter. What does matter, or at least should matter, is that in analogous social states we should be able at once to find definite social antecedents sufficient to account for the phenomena without postulating imaginary social viruses. For an analogy can be drawn between those politicians who attribute social disasters displayed in phenomena normal in times of unrest to the native malignity of man, and those pathologists who, by forgetting what embryology they ever knew, convince themselves that in cancer there are features absolutely *sui generis*. Modern sociology and pathology have alike been deformed by the notion of malignancy against which I have

protested. Parsimony in explanation is the first and last word for science.

SOMATIC AND POLITICAL VIRUS. Since we are not permitted such flights of fancy it remains to be asked if there is anything common to cancer and invasive disorders almost as simple but more easy to understand than their attribution to a wonder-working virus. The student should by now have surmised that the most general antecedent is to be found in nutritional failure, especially if as a sociologist he had become sceptical of the view that it was an imported political virus, and not prolonged social stresses, which finally caused revolutions. Following this social clue I pointed out years ago that cancer was almost always preluded by a rarefaction of the underlying connective tissue which fed and oxygenated the epithelium. The general theory of lymphatic stasis and consequent epithelial innutrition, advocated by Sampson Handley, strongly supports this view. Lymphatic stasis and a damaged commissariat service due to local lymphangitis will not only starve the rapidly proliferating cells of the neogenic zone but, *pari passu*, will break down the natural resistance of the underlying connective tissue itself.

IRRITATION AND CANCER. The view of local malnutrition as one key to the nature of cancer is sound. But there is assuredly another way of causing epithelial starvation. If the destruction of the commissariat preludes it, however that destruction is brought about, there is every reason to believe that prolonged irritation can so push the epithelium into proliferation that its own cells start invasion and actually bring about the destruction of their source of supply. There can thus be cancer without initial lymph stasis. Irritation prevents epithelial cells from leading their normal life, the dividing cells of the neogenic zone are overcrowded but cannot move and remain to divide again. Their normal life is inverted: their predatory nature is perforce disclosed: they seek the food ceasing

to be brought to them and overflow their natural frontiers. We shall see how powerfully this view is supported by social phenomena. So starving soldiers may loot an army service train and, losing discipline, riot in destruction. I affirm that however innutrition is brought about it is the main key to understanding not only cancer but the gravest social disorders. Since there must be essential difficulties for the political student still unaccustomed to think in biological terms, I propose to draw here a clear uncomplicated diagram of what I imagine to be the essential processes of cancer. To see the cells in their normal, their changing, and, at last, in their predatory life, must interest even the most sceptical sociologist.

LESSONS IN CANCER. In this section I shall try to teach some elements of social cell life as popular natural history or cellular sociology. We can begin with the embryonic push of epithelium into the underlying connective tissue where it anchors itself by finger-like papillae to its sources of nutrition. This of itself is invasion, but the invasion is stayed when need is satisfied. It invades more deeply in other cases and makes glands: the female breast is thus formed and we easily understand how the resumption, under irritation and hunger, of the early constructive invasion may become destructive and cancerous. So in the anchoring papillae skin growth may start afresh. In active disease all parts of the invading epithelium may break away in fragments and lay down new detached cancers. This is metastatic growth. That in the course of evolution such colonies have given rise to working glands is more than probable. We know a metastasis by its secretion may take the place of an excised gland. The sociologist should surely grasp such social processes as the great early constructional migrations of epithelium. In the adult it has learnt to live on terms with its slave connective tissue which by the rapid construction of blood-vessels and lymphatics keep it in touch with its supplies. There are few

physiological phenomena more wonderful than the way connective tissue tries to build up an effective restraining supply for errant epithelium as if its cells knew it was their 'hereditary duty' to feed epithelium at all costs. Those who have read and understood John Hunter on the 'consciousness' of cells and tissues will not object to the way this is put. But when we understand the terms on which these widely differentiated cells live, each with its history and status inborn, we see that their combination may be easily dissolved. For in each tissue, each cell, there is a deep hostility to alien tissues and cells, on a true parallel with the dislikes, fears, and hatreds of human classes and nations. In an earlier section I described this as hostile symbiosis, an aspect of constructional status and, on a still deeper level, the attraction and repulsion of physical forces. In the body symbiosis is but an evolutionary treaty. It may be broken without being denounced. If in an earlier place I have tried to free the massed actions of men, as of cells, from misleading and extraneous psychological secretions, thus rendering biological reasoning more easy to follow, we have here perhaps to restore the balance by showing something in cell life not usually seen in text-books. In the social life of our differentiated cells can be found the early passions which deck themselves finally with peculiar psychological ornament.

SOMATIC AND POLITICAL BREAKDOWN. If this common life of the tissues sometimes fails we must ask how the breakdown occurs. But may we not ask first how a social breakdown of human tissues such as that of a starving army ends in anarchy? The reasons have practically been already demonstrated. The cases are in every respect parallel. We may without overstrain call the movements of stray epithelial cells beyond their normal limits, a kind of desertion or even an adventure. But if the food supply fails for them it soon fails for the cells that bring it and the last bar to migration is lifted. The soldiers may prey on their own country and destroy it: they may send out

parties, inspire new mutinies, and in all ways mimic cancer in metastasis. It cannot be doubted that this is remarkably like the course of actual cancer, where there is irritation with innutrition or malnutrition and a weak system of repair. It is easy to see the role of continuous irritation where there is no initial innutrition. If we irritate a germinal area or neogenic zone so greatly that we destroy the epithelial cells and reach the connective tissue area, ulcer results. But suppose that the irritation, though preventing the rising cells from leading their normal life without further cell-division and dying in the normal way, stops short of destroying the neogenic or reproductive zone. Then division goes on in cells that should have lost their potentiality to divide. *Ex hypothesi*, they cannot escape outwardly, there is no normal or disciplinary life for them, and they can but resume their ancient long-inhibited capacity for predatory invasion. There will soon be lymphatic confusion and connective tissue rarefaction. By these and like processes a cancer comes into being. The social student who by now suspects this may have relevance to his work will observe that there is nothing new or monstrous in the case. He has been shown these cells in the growing embryo. In their evolutionary place and order they built what they now destroy. He will see that like social disorders may follow like natural antecedents, none of which are due to the interposition of a deity, devil, or virus, *ab extra*.

MASSSED EFFORTS OF UNITS. By now the student knows continuous disturbance of some kind is necessary to evolution. Disorder must often end in organic disease, and disease in destruction. If that is clearly so in the animal body, what is there to inhibit like phenomena in the social organism? Nations die, are merged or murdered or enslaved by tyrants. These are still biological phenomena. Like cases occur in the embryo. These can be dealt with without accusing epithelium or the parent epiblast of tyranny. Yet we find

strict analogies in crude tissue action. The mesoderm or third embryonic layer is made up or constructed by migrants from the epiblast, just as mesenchyme is an excretion of mesodermal cells which on extrusion build the blood-vessels and general circulatory system. We call this a natural, or physiological process. But even so the social tissue disturbances necessitated are obviously great. It requires little imagination to conceive that extruded cells 'resent' their extrusion: in John Hunter's sense they are 'conscious' of their changed status or relative position. There is reason to suppose that at a later stage epiblastic tissues may continue to expel cells, perhaps unfit for the life of pure epithelium, which are destroyed or perhaps naturalized by the connective tissue. As they again divide they become elements of the corium. Instead of naturalized we may even write 'nationalized.' These are obscure unsettled questions, but I touch on them to show how vivid the frontier life of the true skin and corium must be, how full of incident, how busy with all the tasks of nutrition. And let us notice again how the skin epithelium has arranged in embryo to be sure of its food. The papillae have invaded the food-bearing tissue, thrusting down little fingers or tongues to its army service corps. It is not strange that in stress they should push on farther and hunt like freebooters and bandits. The study of gland construction and gland cancer reinforces these lessons in the natural dangers inherent in the normal construction of living bodies. These phenomena, the deep natural history of life, may well set the imagination painting cities of men struggling for life and nutriment, and perhaps not getting it, even though desperate social connective tissue seeks to prevent disaster. Again it is obvious that the truest analogies in animal and social life are not to be found in the comparisons of organs and organisms but in the parallel massed efforts of units to construct or destroy.

FRONTIERS AND SOCIAL KINETICS. If anything like a moving picture of these somatic frontiers has emerged we must look on cancer as an everlasting possibility and in definite conditions a probability. The same conclusion must be drawn for like disasters in the social organism. In both cases invasion for construction and destruction is an evolutionary process. How is it stayed, and why or how is it resumed? Normal life and normal stresses should help us to an answer. Cancer may enlighten those philosophers who propose to make an end of international conflict. The more realistic politician may be apt to believe that if such thinkers were sent to live on a chosen frontier, there to observe the actual phenomena which characterize international fear, hatred, jealousy, greed, and land-hunger, they might learn what any physiologist or pathologist should be able to teach them with less stress and anxiety. There can be little doubt of the remarkable likenesses between the tensions of the somatic and social frontiers. Peace is but a stay of arms, with the constant dread of invasion. With the ceaseless effort to distinguish between harmless and harmful peaceable penetration, and between honest traders and spies, the frontier scene strongly suggests bodily frontiers always threatened by secret possible enemies. The eternal vigilance of the tissues of any organic body, from an amoeba to the empire, is the price of a relatively short-lived freedom.

CANCER ANALOGUES. I have likened cancer in a nation to the revolt of an overstressed, underpaid, and underfed army. After what was said earlier on immunity students of medicine will have no difficulty in thinking that sarcoma, or malignant revolt of various connective tissue elements, may be nearly matched by a revolt of the police. We saw that on these elements the body relies for protection. It is not absurd to compare mobile police with the wandering reticulo-endothelial cells. Such social sarcoma is easily recognizable, and

the means of avoiding it, or curing it in early stages, should be known to officials of the most mediocre intelligence if they have, by some uncommon stimulus of the intellect, observed the parts played in organization by status and nutrition. We may go on to ask what social conditions give rise to, or threaten, phenomena which, if not so exactly parallel to carcinoma or sarcoma as military or police revolts, are so suggestive of a like social breakdown that their possibility should always be kept in mind by the ruling or regulating classes.

CHAPTER XXII

SOCIAL PRE-CANCEROUS CONDITIONS

FATAL SOCIAL DISEASES. Perhaps fatal social disorders can be disposed of by saying that there are none. A national organism is of too low a grade to die, but it may be merged by sudden or gradual deglutition in a greater. This may occur when it loses its energy and power of defence. A nation can suffer from disorders of a degenerative type which disable it from self-protection in its own ecological field. The fact that social units lose their power is well known. A psychologist might put the fact down to a psychosis; the neurologist might distinguish it as a neurosis; the biologist, lacking such convenient words, must seek a more material explanation. When a number of social units suffer sufficient adrenal damage, hereditary or acquired, to wreck their essential tribal capacity to fight, there is what may legitimately be called a social endocrine failure. It makes no difference that the theory commonly known as pacificism is held by those who are thus degenerate to be a distinct moral advance. Of this nothing more need be said than to note that if militant and aggressive communism requires a justifying metaphysic there is nothing remarkable in communal lack of courage needing one. This condition can be illustrated and perhaps best defended zoologically by examples of animals which hide or crouch or roll up and appear dead in face of enemies which prefer live prey. Obviously a social failure of this order might be a zoological success if survival in a low political grade is to be the sole criterion. But the social organism would be reduced to coolie status. Considering the certain results of such a

social endocrine disorder spreading, there can be little doubt that it should be treated surgically. For though apprehension, fear, and timidity are normal in the individual, they should not in the mass of the tribe be allowed to exceed reasonable political international caution.

WORKING HEALTH. The simple admission that timidity and the possibility of panic and gross collective cowardice are inherent in all physiological construction, strengthens the view that the best that can be hoped for in any organic unit is a state of working health. Luckily the great majority of social units may approximate to this standard. However strange the word may sound when applied to the whole social body, it is certain that no organism of any kind in rapid evolution is ever really 'well.' Certain classes may reach what seems a high grade of health when the mass of the population work and carry on and are yet definitely unfit. I shall not here attempt to discuss how this low-grade health comes about. It is sufficient to bid politicians and sociologists to seek a remedy in direct medical control of conditions. At present these cannot be mended except by the slow movement of ponderous parliamentary machinery. Without a powerful medical service functioning freely in an unrestricted range there will not be in the state a mechanism properly analogous to the great immune system of the animal body. We know that the fixed and wandering cells of this somatic system cannot function if they are already loaded with products alien to the body or with an excess of diseased dead cells. As at present functioning the medical profession seems to be in a highly analogous condition. Its members are so busy in making a precarious living out of those whom a social neglect of health has imperilled that they have no time or energy or allotted opportunity for organized prevention in a social medico-reticulo-endothelial system. They cannot destroy hotbeds of disease. They must labour in them to increase

a social danger. It is true that conditions are not what they were when John Bright and Samuel Wilberforce fought to free slaves abroad and to perpetuate child-labour at home. This was done with such success that many now living have seen mere infants working in factories, which destroyed most of them and ruined the little health left to those who survived. That there has been improvement has not been due to politicians perceiving that physical ill-health in masses of the population is a serious and a possibly malignant social disorder. But with a threatening national environment it begins to be seen at last that though a patient and a nation may carry on they can yet be dangerously ill. Even so it is communism and not the causes of communism that the politician dreads.

COMMUNISM AND SOCIAL BALANCE. It has been argued that the only State organization likely to last for a long historical period with relative satisfaction to all its units must be a caste system. There is no biological ground for communism when very early tribal conditions have passed. However the push to modern communism comes about it is not, or should not be, a necessary stage, since, on the general lines of the somatic argument, it cannot be a permanent political or biological condition. We may say with safety that if it does come about temporarily it will do so only after prolonged political irritation, social innutrition, and denied status. Baulked political instincts are of little importance where status in all its aspects is accepted as normal and healthy by the mass of the population. A healthy, reasonably happy people will care little for politics. A full-fed proletariat prefers other games. However dangerous quarter-educated intellectualism, proud of its painful and misunderstood acquisitions, may be, it is never so dangerous as when its futile ambitions are baulked by hunger. Movement to destructive communism is a symptom of the prolonged incapacity of the central nervous system to appreciate at its crude stage of

evolution the social symptoms which disturb it. Obviously communists are not, as commonly thought, the disease itself. They are, on the contrary, the actual agents of a forced biological de-differentiation preliminary to another attempt by social protoplasm to construct an organic test or shell in which to live. The disorder violent communists characterize created them. Among the main questions a statesman may have to answer is that which asks how far he, and his predecessors for generations before him, should be held responsible for a political and social catastrophe. The very question shows that the statesman, if he is one, is responsible not for the past but for the future, not for the deeds of his fathers but those of his sons. The favourite doctrine of the scientifically ignorant regulating classes, that violence is never justifiable socially, except when used to make themselves secure, is of no value in savage social argument. Their readiness to resort to this pleasant doctrine when faced with irrefragable reason for changes repugnant to their instincts, is but a mark of their fears. Thus they assure themselves and the world in general that those they regard with apprehension have too much sense to rise in revolution. This may be a political anodyne, but it deceives none, least of all those it falsely flatters. Any threat of violence emanating from a class or sub-class is an important symptom, perhaps of social malignancy. It seems that statesmen rarely learn this except by experience. As a result many of them imitate their ancestors, the medicine-man or witch-finder who abuses the evil spirit in possession of the patient. Few of the French, perhaps none of them, saw what Chesterfield saw in 1753. For all the prodromal symptoms, what did Russians of the *tchinovnik* class foresee of the last revolution? Students will infer that a contemporary class or a single statesman does but put the match to the gunpowder their forerunners neglected. It takes time and long apparent security for rulers to reach

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a fatal point of blind incapacity. But with bread and we may get to China. The men who end by believing political evil spirits had, it may be, capable predecessors might have seen that it was not a political devil come at them 'having great wrath,' but a disaster due to centuries of social ineptitude. Yet great physicians have fallen into traps. Historian, statesman, and physician may need more than one post-mortem to diagnose a simple disorder. It is unfortunate both in social life and medicine that there can be comparatively easy functioning when there is yet disaster and organic disease. Cardiac cases may be near death with the patient suspecting it. Such failures may be multiplied and applied to social organisms of all kinds. Yet these phenomena show the immense marginal resources on which all organisms work. It is not always easy to kill a man or a state. But the good physician has at his back experience from the time of Hippocrates, and even before it, for Hippocrates learnt from his fathers. To give him wisdom ten thousands have died. We cannot find statesmen with knowledge painfully gathered by the deathbed of nations. For we have died since what we call 'history' began. Nor do the guesswork post-mortem inquests of historians inspire confidence. The case-books of written history are few, incomplete, mutilated, compact with prejudice, and profoundly ignorant of the patient's organic nature. They are of no use to the statesman. If he would become something more than an empiric it is to biology and medicine that he must apply. Simple as it sounds, he will find that social health and nutrition determine evolution and revolution alike. So violence comes not from over-abundant class energy but from the discontents of a disintegrated nervous system, which is liable to convert a mere theory of society into a gospel of violence.

RIGHT OF DEMANDING SACRIFICE. There is no biolog

'right' to anything, but there is undoubted biological action in a crisis which sacrifices what comes handiest to the life of the social organism as a whole. This action, of necessity, may mean the death of millions of soldiers, the forced labour of civilians, the execution of military recusants, and the confiscation of capital and wealth of all kinds. National stress may demand the expulsion of politicians. They may reflect on the historic fact that they have often been expelled from public life to public advantage. But as a general biological principle it is organically inadvisable that any class should continue to suffer when the emergency has passed. It may even be politically advisable to endure for a time the exactions of a purely parasitic section, such as is usually as much a part of the richer classes as beggars and tramps are of the working classes. There should, in fact, be no unnecessary disturbance unless social nutrition and health are in danger. An organism that works easily must not be tampered with on pure theory. It follows that where it works badly any sacrifice may be demanded. To avoid revolutionary stress society must call the doctor and pay the bill. If soldiers have to die the richest may well become indigent.

PROTOPLASM AND THE DOCTOR. Few with social or medical vision will deny that the doctor is badly needed and badly employed. He is bidden to keep alive those who should die, even those who desire death: he saves the newly born whom mercy would allow to pass, and the old who are a burden to themselves and the state: he preserves the mad and weak-minded to beget the mentally and socially incapable, and, by thus occupying himself in keeping disease in being, is bound to his task of social disintegration by economic necessity. And this at a time when all his energies should be devoted to the birth and preservation of citizens fit for social duty. This is plainly the biological way to look at medicine, but it is only within the last few years that any

national organism in the world has awakened to the fact. Those which have done so have been stirred by the ambition to create a fighting race not hampered by a vast proportion of practical invalids. This movement has certainly not been founded on the fact that good health and biological happiness may prevent social internal disasters. For the present national movement has been the result not of medical but of military necessity. It has taken heavy international stress to show this country that it is far indeed from being 'well' as an organism. But the nation is indifferent to science that cannot pay early dividends in cash. We may make a peer of a socially successful physician, or even of a great one, but do not listen to him except at the bedside of a king. If he were to speak at the bedside of a nation few would listen. If it is irrelevant to impute blame to the social organism as a whole, it is equally irrelevant to blame the medical profession as an inchoate organ, since they too have to struggle with innutrition in a doubtful and anxious status. There is a marked political reluctance to admit that symptoms are not diseases but signs of disease. Admission would imply action. It is easier to blame the sick than the conditions that destroy health: easier to impute natural vice to the idler or the criminal than to inquire what create them. But when doctors break away from the ancient doctrines of Possession these still hold with one type of politician. If it is not still believed that a man owes all illness to his own folly or to the devil, many come near to the belief that poverty, ill-health, and a morbid environment do not cause or excuse the revolutionist or the man who at last denies his own country. This will not be held by the physician. If social organic ill-health shown by individual and class innutrition or malnutrition means anything, it means that the medical profession should hold a far more authoritative position than it has yet been given in any country. It should most obviously be a State service with

drastic powers to abolish conditions inimical to health, rather than a profession too largely devoted to prolonging the lives of the nationally and socially unfit. This would restore the physician to his proper status in the social organism. The medicine-man from whom he has descended was a power, or weapon, in the hands of the chief or the tribal elders. He was gradually extruded from this position by the evolution of the priest. It cannot be said that the churches, ostensibly concerned with imaginary souls rather than material bodies, have a deep sense of social hygiene or the nature of social disease in general. It might have been imagined that among the few clerics who have made contributions to science one could have been found who understood the nature of invasion and the invasive disorders.

SOCIAL ANALOGIES OF INVASION. After this excursus, for which I make no apology, one can return to the disorders which gave rise to it. The question is whether there will be found in societies advanced and visible, or quietly latent, processes which are analogues, or even homologues, of the somatic invasive disorders, even if no social phenomena exactly like carcinoma of the body could be looked for in a low-grade organism. Nevertheless, where there is revolt and invasion and breakdown of established social barriers by disorderly elements, we cannot avoid seeing at least a strong superficial resemblance to cancerous processes. There are undoubtedly densely populated areas in which cancer is closely mimicked if the social units are continuously stressed generation after generation, provided the stresses are not so great as to crush all capacity for violent reaction. It is also necessary to postulate that the birth-rate is kept up, which is so often the case in apparently dysgenic conditions. The student will remember that where the neogenic zone of epithelium is destroyed there is an ulcer, but no direct cancerous growth. Such districts are likely to be characterized by increasingly anarchic and

aggressively communistic features. In them there will be little communist metaphysics but a natural trend to violence. For extreme reversion to low tribal or even mob characteristics is but a forced movement of stressed units towards better nutrition, environment, and status, and is therefore as purely biological and natural as tribal content and happiness in a South Sea paradise. Its violence is a measure and proof of its extreme de-differentiation. These should be political commonplaces, even if the canceroid analogies are denied, but it is proof of the thesis that intellect plays no part in evolution when we note in past and contemporary history the total incapacity of those who benefit directly or indirectly by the innutrition and overstress of others to recognize the danger to which their own status is exposed. Speaking in political rather than in pure biological terms, it is notorious that efforts to get local or state action in cases where such should be early and automatic are met by suggestions that presently, in political time perhaps, a general scheme to deal with all such areas will be produced. Thus might the medical profession neglect sporadic outbreaks of plague while they hatched in conclave a scheme for doing away with it altogether. To say so is not to go outside the professed limits of a biological argument. The delays and follies of obtuse and purblind politicians constitute part of the machinery of evolution as of revolution, and I shall have written to little effect if I have not shown that, though intellect has but a small part to play in history, the acute want of it may have grave results.

SOCIAL CANCER SYMPTOMS. What, then, are the phenomena or symptoms of social cancerous or pre-cancerous states? One chief mark is an explosive tendence to violence. But this may be equally a mark of a passing ailment. If violence in talk or action were found where there had been continuous unemployment, overcrowding, and innutrition, permanent or prolonged, it still might not be necessary to

liken the resultant conditions to cancer. I should hesitate to do that until there had been marked hereditary unemployment among the boys and young men of the second and third generation, who thus grew up to maturity and fertility without social training in definite function. If the sociological and political student will recall the strictly analogous stages in my description of cancer, he will assuredly be struck by the continual proliferation of cells in the neogenic zone, which are unable to lead their normal biologic lives, and therefore retain to the full their powers of division and multiplication. If this is not very nearly the essence of somatic and social cancer it comes exceedingly close to it. The danger lies not so much in idleness or in an evil environment, or in malnutrition, as in the profound social disintegration inevitable when there is no training, direction, or discipline for the coming generations. Even in this stage the affected area may send out colonies of socially disaffected and socially disaffiliated units, likely to establish themselves elsewhere, just as cancer fibrils creep into lymphatics, or are carried away as emboli in the blood-stream to set up metastatic colonies where the soil is suitable.

EXAMPLE OF TRUE SOCIAL CANCER. If phenomena like these inevitably suggest cancer there have been historic and authentic instances of more striking and fearful parallels. One such case is said to have occurred in Siberia during the last war. Isolated village communities suffered so much from famine that they were obliged to eat not only all their reserve stores but their seed corn as well. For want of firewood they burnt all the superfluous parts of their huts and barns: and, going farther afield, dug up the sleepers of the railroad, which might have brought them succour before they resorted, as they are credibly reported to have done, to murder and actual cannibalism. Those who have grasped the dramatic phenomena of cancer will remember how remorselessly the

epithelial cells invade the area beneath them and dissolve and consume the cells which bring their food. It is highly probable, though without possible proof, that this predatory tissue consumes its own weaker constituents. Whether epithelium eating up connective tissue cells and its own supply lymphatics and blood-vessels can be properly described as cannibal I do not know, but if epithelium actually eats epithelium there is no doubt what the process may be called. It should be remembered that squamous and columnar epithelium will fight desperately for hold on a nutritive area, thrusting under each other as they heal an erosion at which they meet. At one point squamous cells win, and at another columnar, and as they lift each other off the underlying growth the unsuccessful epithelium perishes of starvation. With even more stress a true cancer analogue might discover itself. Even those students who are without physiological experience may well consider these phenomena in the light of hostile symbiosis rather than in that of the more popular theory of friendly symbiosis, in which cells and tissue are moved by altruistic motives of a highly commendable nature.

THE EDUCATION OF STATESMEN. Whether these illustrations and analogies and homologies will turn the student to like investigations matters little, since the whole of this argument was initiated rather to excite reasonable, and reasoning, curiosity than to offer immediate help in the treatment of social disorders. Since statesmen, even the ablest, may esteem themselves fortunate if they can forecast the year after next, it is not to be supposed that the biology of events with which they have to deal, and of which they form a compelled part, will very greatly commend itself to them. No one will be rash enough to imagine that the next revolution will be foretold except by a pessimist who always prophesies disaster and must therefore some day be right at last. An hour with a physiologist or a physician might convince optimists and pessimists alike that

though great social diseases have their origin in the past, they can be initiated in the present. And the same teachers might show them that a long period of apparent peace with a powerful dominant class tending to rigidity is far more dangerous than the comparatively healthy action and reaction of a reasonably discontented population. Whether any social organism at present tending to develop on physiological lines into class and caste instincts can prevent the totally unnecessary de-differentiation of a communist revolution, is very hard to say. But of one thing we may be sure: such a state will not be achieved or such a revolution prevented by the collective intellects of statesmen.

CHAPTER XXIII

THE BIOLOGY OF GOVERNMENT

THEORIES OF GOVERNMENT. If State government be regarded from the standpoint taken in this essay, we can at once ignore many of the pseudo-historical and moral tasks undertaken by Aristotle, Hobbes, and Grotius. Such subjects as education, virtue, and religion, when they transcend basal social instincts, are of little interest to the biologist. Most of Aristotle's *Politics* can be ruled out as irrelevant to anything but the Greek *polis*, for the most practical parts of it can, perhaps, be discovered in Machiavelli's *Prince*, an incomparable work of art and organic wisdom. What the great jurists of later ages have said of government and sovereignty is even less relevant to physical and physiological science than Aristotle on virtue as the Greeks understood it or than Hobbes on religion. But if we ignore what Maine terms the analytical jurists we need not ignore such a lawyer as Maine himself. It is a remarkable fact, to be noted here with natural satisfaction, that he wrote in his *Early History of Institutions*: 'I know of no more striking instance of a historical misconception (though at the time a natural one) than Hobbes's comparison of privileged corporations and organized local groups to parasites which the physiology then becoming fashionable had shown to live in the internal membranes of the human body. We know now that if we are forced to use a physiological illustration, these groups must rather be compared to the primary cells out of which the whole human body has been built up.' Although this does not instantly justify us in claiming Maine as an organic materialist we can,

I think, infer that he would have accepted with little hesitation the views here expressed on social overgrowths. That he saw so much even as illustration may make us wonder the more that a lawyer and historian like F. W. Maitland should have gone out of his way to attack the theory of the social organism, as it was left by Spencer, and even to depreciate the possibility of scientific historical generalizations. For Maitland's defence of the monograph, which was followed by Mandell Creighton in his preface to the *Cambridge History*, must seem to biologists a radical denial of science associated with Mill's Inverse Method disguised. If in this place we therefore neglect him and such theorists as Bentham and Austin, for whom all the same we must have reasonable respect, the one remaining way to treat government is to regard it, not as an historically elaborated and sophisticated instrument, but as a tentative and experimental physiological apparatus responding to the internal and external environment in accordance with physical law. Whether this can be done with practical advantage to politicians may be doubted, but it cannot be doubted that if it can be done at all the task must be assigned to the biologist.

FORMS OF GOVERNMENT. Yet after what has been previously argued it might almost be said that the easiest way to deal with social organic government is to declare that nothing of the kind exists. For 'government' is a loose psychologico-political concept with which science can have no direct concern. When it is sought to translate the word into biological language it disappears and the social organism, of whatever order, is shown as a low-grade individual with nothing to guide it but tropisms and crude instincts. The net result of work by all great students of the subject has assuredly taken us no further. If this is so we see at once why such words as sovereignty, autocracy, democracy, oligarchy, dictatorship, and even tyranny have little or no scientific meaning. Perhaps the best that can be said for them is that

they enable historians and lawyers, who can breathe among abstractions, to deal in bulk with the phenomena that Burke so greatly feared to analyse. That they seem to represent ideals to the politicians who prefer each successive and passing form means nothing. And yet, when considering a social organism, whether it is a nation or a protozoan group, we seem to see purposive movements. If there are really such, even in the simplest form, there is government of a kind. Can it be subsumed under any of the heads just mentioned? I shall not attempt to discuss questions which have been handled by historians without law or science and by a few happier writers who knew much law and perhaps a little science. For in one great respect lawyers approximate to men of science. Though for the most part without specific teaching they are bound to recognize linked constructive evolution in the great skeleton of law itself, in its life, growth, variation and function. It seems, indeed, as if they had reached without biological aid the conception of a species of social organism in Corporations treated legally as Persons, a truth disguised as a fiction derived from the Roman Law of Persons. This by itself, unsupported by professional cynicism acquired from observing the hard hearts of corporations, would dispose them to disbelieve that the state has a semi-mystical existence directed by an entelechy or daimon. Those who know corporations or committees have little belief in ruling wisdom. Yet many writers, and more orators, speak of the 'State,' not meaning the whole national organism but a special though unspecified director. This is, perhaps, natural enough as political shorthand, and even those who content themselves with simpler conceptions of the authoritative instincts may admit as much. It seems to many that authority must have a definite seat or throne. But when we look for it, there is none. Isis unveiled is no mystery: for Isis unveiled does not exist. I shall presently speak of the somatic ego. It looks as if the 'State' or social

ego was as mysterious an entity. What is said of it would be folly were it not that the mere conception is instinctive evidence of the real existence of the social organism. However that may be, such conceptions as abstract legal sovereignty must for biologists remain verbal exercises. For if what has been advanced has a meaning, there is not, and cannot be, anything like supremacy in the governance of organisms. It is true that some eminent men of science are inclined to look on the brain and cerebral nervous system as truly dominant. Keith says: 'The society represented by the animal body is a slave state.' Yet we assuredly cannot look on the powerful glandular castes as deprived of liberty, however we define this dangerous word. I shall not discuss whether cells doing what they must do by somatic hereditary instinct are free to do it. To speak of the brain as dominant is once again to commit the physiological fallacy of turning a complex of highly specialized cortical castes into a unit. We know these powerful millions are at the mercy of the glands. The political student naturally inclined to look on the brain as a unity, should learn that it is a complex society of at least five castes dispersed in a pattern of institutions or departments, each communicating with each and performing specialized and unspecialized work. To say so is barely to touch upon the infinite complexity of central nervous functions. This multitudinous responsible society is most curiously policed and scavenged by the microglia, wandering mononuclear cells belonging to the reticulo-endothelial system. These cells originate in the mesenchyme and thus have no direct connection with the brain cells which arise in the ectoderm. It may be remarked that the microglia cell is not found in the embryonic brain, which it invades at birth. We see that so far as there is anything like central direction it emanates from the primitive embryonic layer with the earliest and most intimate contact with the environment. This should afford a useful political argument for the existence

and influence of the soldier and the conservative. No physiologist should think it absurd to say that the claim to, or the assumption of, guidance and governance by those social tissues which by tradition are dissociated from the environment and are directly associated with internal social functions, is equivalent to the seizure of somatic authority by mesenchymal tissue. Obviously this occurs somatically in extreme maladies or in great pain. It is seen socially in anarchic or extreme revolutions. But the resulting disorder is usually and finally corrected by those whose traditions are 'ectodermal.' To recognize this is to recognize the social organic provenance of historic characters such as Robespierre and Napoleon. I refrain from characterizing Napoleon more fully, though much might be said on him biologically. I do not think analogies of this kind, based on facts not yet to be found in the common text-book, are alien from this discourse, since one of the greatest traps in scientific thought lies in our natural proclivity to simplify phenomena before we have classed them. In any case it should now be seen clearly that to seek a final seat of authority in the most highly organized body we can dissect is as vain as to look for it in the social low-grade organism. Biology knows no sovereign power and physiology has long denied the 'soul' a lodging in the pineal gland. It is scarcely a matter of wonder that the zoologist and palaeontologist tend to ascribe all directive power to the environment. They easily learn to see that the State is a social 'animal' at its mercy.

THE SOCIAL ORGANISM AND THE EGO. When discussing authority it is impossible not to refer to that remarkable 'creature,' or *persona derivata*, known to psychologists as the ego. We may certainly draw an instructive parallel between the complex executive of a national organism and the even more complex executive of man which should result in the physiological disappearance of the 'ego' and the 'State' as entities apart from their bodies. Metaphysicians for the most

part, and theologists as a caste or clan, regard the ego as a true unit. A very little physiology dissipates this ghost. For just as physiological action behind political phenomena can be looked on as the 'noumena' of political life, as I suggested in the first chapter, so physiologists and biologists are bound to look on human 'mental' phenomena as determined by their biological noumena, the physiological play and action of the glands and brain. It may need courage thus to use a word sacred to metaphysics, but the parallel enables us to see that the 'ego' and the 'State' are exactly analogous excursions into what might be called a kind of Platonic realism. The apparent verbal simplicity of 'I' or 'me' or a 'government' vanishes like a ghost at dawn. Nevertheless we may feel for those who recognize the millions of a national organism but, having been taught to look on the body as a unit, find it hard to accept both as infinitely complex societies. At the back of the 'simple' ego there are a million million individual cells, of which a thousand millions belong to the cerebral castes. I shall be bold enough to call these 'persons.' They may even be looked on as the juristic persons of Roman law, or corporations, since they are in themselves working complex aggregates of protoplasmic units, as I have previously defined them. But regarding these cells as mere individuals we see that they must have their private intra-cellular and their public communal lives to lead, their massed social functions to attend to for the basal purposes of nutrition, repair, immunity, defence and offence, and all the manifold tasks of active life. It is in these and on these that the imaginary ego inheres and offers its elusive and illusive projection to the psychologist. And in like manner in the units of the social organism inheres the visionary 'State.' When we contemplate the activities of man and turn from him to cell life there should be no strain or absurdity in speaking of cells and their castes having traditions and even 'trades,' such as the skilled mastercraft

which builds and unbuilds bone according to the stresses of function. It is impossible to think so without being more than ever convinced of the deep essential likeness of structure and functions in all parts of these contrasted organisms. When we forget the baseless and often absurd analogies which have been drawn between the functions of high-grade and low-grade organisms, we can perceive, not merely analogies, but profound homologies in the massed actions of cells and men. In losing the very idea of government we see how states and men are ruled.

STRUGGLE FOR DOMINANCE. Nevertheless, though we may see sovereignty in solution and legislation itself in repair, it must be owned that the practical problems remain. They remain to be discussed but never settled for an age or an era until, and while, the caste state exists. I think it easy to imagine that such a system should be happy in the sense of easy functioning, and there is no other criterion of social or somatic health. If ever such a relatively static organism proves itself there will be in it no permanent questions of inferiority, superiority, or dominance. Those who have dealt with men know that the meanest subordinate may be happy in his function. He regards himself as a vital part of the machinery. There is such a state of things as being at once dominant and subordinate. Every executive rules and is ruled. There is a cabinet. But there are also permanent officials. The glands can push intellect off its throne and innutrition reduce the glands to impotence. In the end we have to admit that we are all, cells, men, and states, the slaves, or at least the creatures, of the sovereign environment. So far as the body is concerned the conclusion must be drawn that, under that environment, it is ruled by an oligarchy and many oligarchies in their due order. And this is true of social national organisms, no matter with what traditional ornaments we deck the apparent seat of power or what words are used to denominate the

fluctuant forms and forces of tribal organization. The more we see of politics the clearer it becomes that the committee, however we name it, is king. Its main task is always to preserve its own being and to prevent encroaching tissues and institutions, still in growth, from grasping power. Its efforts must in the end be vain. There is nothing in the history of evolution which shows dominance securely attained, and there is nothing in the nature of protoplasm which renders it likely. It may be reckoned extravagant to speak thus, but a few may be encouraged to simplify thought by accepting the view that all our basal conceptions, including the great constructional principle of compromise, spring from the potentialities of protoplasm. The pure biologist, unstained by the dyes of theology, must believe protoplasm the fountain of what wisdom there is or can be. Its immense capacity for compromise is the effective basis of oligarchic and general executive rule. Where there is no compromise possible with over-rigidity there will be revolution. The nature of the material is always the factor of determination and the environment the factor of realization. It is therefore consonant with all that has been said to affirm that the less the mass of the population is forced to think of government the better. Great general political interest is the sign and measure of an incapable executive or of a dangerous and uncontrollable environment. These may be the simplest platitudes, but they serve to dissipate the fog of words in which sovereignty has been enveloped since Aristotle, who cannot be accused of saying too little on the subject.

THE EXECUTIVE. In the mammalian body the nervous system is a means of delegating function. A part having been warned acts in its own place. In low-grade animals primitive irritability of tissue, which is the final source of nerve tissue itself, acts in the same way. Delegation and action by a committee, however that committee may be composed, is

a method normal in protoplasm, and if so an executive is no evolutionary mystery. Nor is it any wonder that it should usually be a very primitive organ. Yet if, as I have suggested, popular discontent with such crude social headquarters may be held to measure executive incapacity, it does not follow that the executive is in active fault. Protoplasm always does its best, whatever some pathologists and politicians may aver. It does its best even in cancer: it may do its best as well as its worst in cancerous political life. The great cabinet is but protoplasm after all. Those who compose such an experimental organ may revolt against the notion that they are as a body absolutely subject to organic evolutionary law. But in its protophase, growth, and progress there is every proof of it. The internal unresolved strains and the external stresses characterizing such a living but highly labile body account for some of the apparently low-grade marks of high politics: the failures and follies and even frankly amazing stupidities of a cabinet or party in which individual brilliance and rare foresight are totally merged. We can begin to see how a powerful politician, to secure the safety of his party, may risk the nation's very life. We understand why a brilliant politician may become a political outcast. He is rejected or ejected by the cabinet, which above all things wishes to endure and therefore fears anything new. This is normal conduct in any institution, organ, or organism. Organisms rarely commit suicide and cabinets cling to life. For political life as a life of high metabolic activity is something to cling to. Those who lead it have the illusion that they really matter. An ejected politician is a mournful spectacle: he wanders on the confines of power like the scapegoat in the desert. The position of the accepted head of the government is often almost as pitiable. Or even more. He is probably a compromise and knows it. He is what he is to prevent a more powerful personality occupying his uneasy throne. A definite ruler or central

power is hard to find, and even when found is seen to be an illusion. Whatever jurists may say, the tribe is the only possible sovereign, and all schools of politics finally act in the same way, by means of that temporary oligarchy known as a committee. Even a passing tyrant or despot must obey his staff, for the committee is a biological necessity and as much a tribal tool as a powerful multinuclear cell is a somatic tool or weapon for special work. Kings themselves easily cease to be of direct biological importance when they become lords of a settled territory rather than chiefs of a free-moving tribe. They, like serfs, are *adscripti glebae*, attached to the soil, and are more and more subject to those they are supposed to rule. The tyrant, despot, or leader who inevitably appears on social stress may be of much higher functional power. For he emerges as a definite tribal chieftain with an effective, if not a majority, following. He is never a tyrant sole or singular. Even with him we cannot dismiss the oligarchy, whatever we call the staff that runs him. But his taking command, or apparent command, is a sign of new growth, accompanied by the concurrent atrophy of integral organs. In physiological terms we see at the same time tissue regeneration on new lines, a phase familiar to histologists as metaplasia, where retrogression precedes new and unlooked-for growth. Yet this growth may again proceed on normal lines. The leader easily becomes the emperor and the fountain of honour. It is clear that kingship and leadership no longer mean the same thing, though with mass militant migration they may become similars. Both are supposed to be held in honour, both are supposed to be obeyed, but in practice it is the leader who is honoured and the king who has to obey. The king has become a rudimentary organ, at the best an official liable to be dismissed by the governing oligarchy or to be quietly displaced by a tribal leader.

MORBIDITY IN GOVERNMENTS. All examination of the

machinery of social organic government emphasizes what has been said of evolution as a borderland morbid process. In every form of somatic, social, or political rule we see all the phenomena, characterizing what I have called hostile symbiosis, which continually verge on breakdown and open hostility of the parts. We must recognize these approximations to breakdown as a normal part of the living activity of governments as it is of all other living organic growths. They characterize alike colloids or a cabinet. To study these phenomena in a detached scientific spirit, while there is yet time to understand them, is a proper task for the politician and sociologist, and even for the historian. I should be ashamed to underline such platitudes were it not obvious that sociologists misinterpret politics as badly as politicians misinterpret sociology. Both separate inseparables, they take the social organism to pieces as if it were a watch. Few see the living and pulsing tissues of the creature they undertake to rule or explain: they fail to recognize the 'State' as the whole organic tribe moving or in camp. As a result there are too many social dreamers and too many prophets of ill: they promise peace and paradise, or in panic foretell social death. There is much social learning and little social wisdom, and there will be little till those from whom the organs of rule and direction naturally derive seek to understand the great living organism, of which they would be responsible and effective parts. With understanding there should come both courage and caution. The politician might then learn to contemplate the very assembly to which, it may be, he belongs, as a live self-perpetuating organ representing, not too well, its separate members, its hostile and sub-hostile symbiotic parts, its massed constituents, and finally, though never fully, the great tribe itself. An adequate study of why parliaments, governments, kingdoms, and empires must, like all other organisms, fail and fall at last may be beyond him. But it is well that those who would

govern should understand their perilous status and remember that what they work in is evolutionary, tentative, vulnerable, and liable to death. They will pass and be replaced, and those who succeed them in normal political growth will do well if they follow national social organic instinct, rarely transcending it by experiments based on faith rather than facts. Of late more has been heard of speculative hope and experiments in faith than of political organic realities, but it may at last come to be seen that enthusiasm so to enlarge the social unit as to secure the peace of the world means no more than an attempt to forestall evolution itself and create a new organism 'according to plan.' That there can be nothing vainer might matter little: that such improvidence in haste may hurl a continent into ruin matters much.

APPENDIX

THAT this discourse must be reckoned no more than a short introduction to a difficult subject, not hitherto explored, should long ago have been clear. Sociologists and the few politicians who have studied societies seriously will see that important phases of function and social growth have been ignored or barely touched. The little said earlier of religion had more to do with the structure it creates than the function itself, with which biology is not greatly concerned. More may be added here, together with something on social reproduction. This subject has not been so much as mentioned. I should say nothing of it now, even in a note, were it not that silence might be attributed to over-caution. But however inadequate the survey of the social field in the text, I think it obvious that the apparatus employed can simplify by reduction any problem offered by social organisms. The mere possibility of escape from formless historic theory and the painful compilation of statistics must encourage the weakest inquirer as he observes his fellows at the appalling task offered him by Mill. I would therefore not discourage him by seeming to shirk the more difficult points in theory.

RELIGION AND THE STUDENT. It was stated earlier that religion of any order must be shown to carry a biological warrant if it is to procure admission to the social laboratory. Yet it need not be discussed exhaustively as a biological factor. It is sufficient to indicate lines on which the student can conduct an analysis for himself. He may consider the tribal deity as an integrator, a factor, or set of factors, pulling the tribe together and giving it confidence. This confidence is thus founded on the belief in a powerful 'backer' arising from and with the very integration of the tribal organism. For apart from all superstition there *is*, in fact, a powerful helper at the shoulder of every warrior: the whole tribe itself. This is the friend behind phenomena, the encouragement given by his fellows. So far religion thus conceived must tend to tribal coherence, race-making, and national organic social salvation. With tribal coalition, due to outside stress, resulting in nationalities and actual nations, this simple faith tends to disintegrate. How greatly it may disintegrate can be seen in the rise of individualism, which ends at last in losing sight of the tribe and becoming a doctrine of personal salvation.

The conceptions found in a more elevated and general theology can, of course, be held by the more hopeful to foreshadow a whole world organism, and may thus be connected directly with idealistic internationalism, a destructive tribal doctrine. So far as these notions outrun political and biological conditions they must naturally tend to weaken national coherence and confidence. This can be seen in the tendency of primitive Christianity to dogmatic pacificism, the chief cause of the racially legitimate Roman persecutions, arising in a practically enslaved people losing its natural combative instincts. Such a non-resistance doctrine can easily develop again in a nation losing tribal confidence and personal courage, whether this be due to racial adrenal failure, as I have suggested, or to some other physical cause. Propaganda of so dangerous a kind should be repressed with extreme penalties. It may be asked whether modern western religion, by its inculcation of moral notions repugnant to normal physiology, medical hygiene, and to all who regard tribal health and fitness as the greatest social aim, does not as a powerful factor tend positively towards ill health. It is true that many politicians, themselves without belief or a particular faith, consider hypertrophied religious instincts as useful absorbents of energy which might otherwise be dangerous to the state. Without suggesting any forced conclusion it may be urged that religion in many cases has outrun the evolutionary state of the world, which as an organism, actual or potential, is of a very low grade and utterly unfit as yet for a hyperphysical or extramundane creed. The result is to be observed in nations returning through stages of de-differentiation to increased homogeneity with a strong tendency to a simplified racial religion. The biological physicist will observe with peculiar interest that these phenomena are naturally, according to physical law, accompanied by the exhibition of great energy. The process seems a reasonable return to practical racialism where there is great external pressure. Similar tendencies should be encouraged in countries not yet free from clerical domination of a dysgenic kind shown in efforts to prolong useless, painful, and even dangerous lives: in stubborn preservation of the unfit and the idiot: in encouragement of fertile mating among those who should be legally sterilized: and in obstruction to the last moment of reasonable divorce. The action of the churches in all these respects is unphysiological and socially harmful. I do not propose to examine the national results of hypertrophied ecclesiasticism further. The system has its good side. I leave both sides to the sturdier student as a fair field of exercise in the general method of analysis which I recommend as the only easy method

of finding a frame of social reference. He may well use it to discover what biological service or disservice the apparatus created by religious beliefs at a vast absorption of economic energy has done the social organism. He will ask whether a state church or a loose aggregate of sub-hostile churches can be looked on as an integral organ, as a useful symbiont, or as a facultative and even actual parasite, remembering as he does so that they may be all these at once. To treat such institutions fairly we have to look on ecclesiastical activities as the result of proto-plasmic units engaged, like all other nascent groups, in a struggle for every possible course of nutrition, a struggle to build a 'house' to function in, and a struggle for power. By regarding these specialized units as engaged in constructing an instrument of authority, tradition, and property, we can avoid the necessity of saying more of belief than that it may indicate the energy employed. Ecclesiastical history becomes sense as the struggle for power of an organism or an organic part. Its trend is not so much to teach as to secure power by growth. Proselytism has thus a sound material basis since each convert is a new unit of power. History demonstrates that churches aim at nothing less than universal dominion, as all growths do in their turn. Bacon in one essay speaks in warning of an overgrown clergy. Obviously we must understand ecclesiastical history as biological adjustment under stress, breakdown, and repair, a law equally applicable to creeds themselves. We recognize an organism which finally will suffer the fate of all organisms.

SOCIAL REPRODUCTION. To discuss reproduction implies the discussion of the reproductive organs of the social organism. The use of such a phrase is a direct approach to the pure biological simplification of a problem which, when regarded in darkness by the gleam of a religious or ethical candle, may well affright the most courageous philosopher. Yet as soon as we reduce without emotion the inclusive female element in the social organic body to its physiological status as the main reproductive organ of an organic nation, we see at once that secondary or derivative moral rules are irrelevant unless they tend directly to healthy and adequate social reproduction by ensuring a happy and cheerful performance of a great national function. The right to restrict it should be confined to the prevention of unnecessary morbid offspring. That moral systems, like all other systems, may behave like overgrowths and become harmful and dangerous cannot be doubted. A moral law may be a biological error, a physiological crime, and a pathological agent of disease. While leaving this with

confidence to the isolated student and with no confidence at all to the politician who *ex hypothesi* is far from being left alone to form an opinion, I think it may help the former to reach reasonable conclusions if I make one special comment. It is surely very remarkable that in nations dying for want of full reproduction women are prevented from reinforcing their race by taboos and economic conditions which forbid normal experience until they are long past their most fertile age. It is therefore curiously interesting to observe that France, the European country most deeply concerned about her lessening population, should be that in which socially illegitimate but racially righteous births receive the bitterest condemnation. The conclusions to be drawn will be repugnant in the highest degree to those bred to types of moral teaching of which the most rigid kinds are found in the savagiest peoples, but the student who turns out of his laboratory the intrusive theologian or moralist can let in the light of day. It is impossible to dissect the reproductive organs in fact or theory and at the same time to be moved by a passion for irrelevant ethics. A proper subject in social pathology is an unprejudiced inquiry into the disorders of the social reproductive system, a study not necessarily connected with individual disorders, which are a by-product of the social loss of health. The functional pathological failures leading to repair and variation have been those mostly studied in this book, but there are true organic diseases which end in social and national death.

A SHORT BIBLIOGRAPHY

ADAMI, J. G., *Medical Sidelights on Evolution*, 1919.

ARISTOTLE, *Politics*.

ATKINSON, *Primal Law*, 1903.

BACON, FRANCIS, *Advancement of Learning*.

—, *Essays*.

BAGEHOT, WALTER, *Physics and Politics*.

BAIN, ALEXANDER, *J. S. Mill, a Criticism*, 1882.

—, *Mental and Moral Philosophy*.

—, *Senses and Intellect*.

BAINBRIDGE, W. E., *Cancer Problem*, New York, 1914.

BASTIAN, H. C., *Brain as Organ of Mind*, Int. Sci. Series.

BATESON, PROF. W., *Biological Fact and the Structure of Society*, 1912.

—, *Materials for Study of Variation*.

BAYLISS, SIR WILLIAM, *Principles of General Physiology*.

BLAND-SUTTON, SIR J., *Evolution and Disease*.

—, *Tumours*.

—, *John Hunter*, Hunterian Oration, 1923.

BRAMANN, 'Descensus Testiculorum,' *His. Arch.*, 1884.

BUCKLE, H. J., *History of Civilization in England*.

BURY, J. B., *History of Freedom of Thought*.

BUTLER, SAMUEL, *Luck or Cunning*, 1887.

—, *Unconscious Memory*.

BUTLIN, SIR H., *Unicellular Cancra*, 1912.

CAMPBELL, DR HARRY, 'Biological Aspects of Warfare,' *Lancet*,
15th September 1917.

—, *Man's Mental Evolution*, 1913

CARREL, ALEXIS, 'Le Sort des tissus cultivés,' *Rev. Gén. des Sci.*, 24.

—, 'La Présence d'un tissu antagoniste,' *C. R. Soc. Biol.*, 76.

CECIL, LORD HUGH, *Conservatism*.

CHILD, C. M., *Senescence and Rejuvenescence*.

CHITTENDEN, R. M., *Physiological Economy in Nutrition*.

- COPE, E. D., *Origin of the Fittest*, 1887.
COPE, H., *Inheritance of Acquired Characters*.
CUÈNOT, L., *La Genèse des espèces animales*, Paris, 1916.
CUNNINGHAM, J. T., *Heredity in Relation to Secondary Sexual Characters*.
—, 'Sexual Characters and Hormones,' *Proc. Zool. Soc.*, 1908.
—, *Modern Biology*, 1928.
- DALE, HENRY H., 'Anaphylactic Reaction in Plain Muscle, etc.,' *Jl. Exper. Ther.*, 4, 1912.
—, 'Biological Significance of Anaphylaxis,' *Proc. R.S.*
DARWIN, CHARLES, *Origin of Species*.
—, *Descent of Man*.
—, *Voyage of the 'Beagle'*.
DAVENPORT, E., *Thremmatology*.
DENDY, A., 'Progress in Evolution and Origin of Species,' *Zool. Sec. D. Brit. Assoc.*, 1914.
DRIESCH, H., *Science and Philosophy of Organisms*.
- EIMER, G. H. T., *Organic Evolution*.
- FARMER, PROF. J. B., *Plant Life*, 1913.
FOSTER, SIR MICHAEL, *A Text Book of Physiology*.
—, *Claude Bernard*, Masters of Med. Series.
FOWLER, THOMAS, *John Locke*, 1880.
FRAZER, SIR J. G., *The Golden Bough*.
—, *Totemism and Exogamy*.
- GALTON, SIR FRANCIS, *Enquiries into Human Faculty*.
GASKELL, W. H., 'Cranial Nerves and Origin of Nervous System,' *Jour. Physiol.*, 10.
GIBBON, EDWARD, *Decline and Fall of the Roman Empire*.
GOODHART, SIR J., 'Passing of Morbid Anatomy,' *Lancet*, 26th October 1912.
GOODRICH, E. G., *Living Organisms*, 1924.
GREEN, C. E., *Cancer Problem*, 1919.
GREEN, REYNOLDS, 'Vegetable Physiology,' *Ency. Brit.*, 11th ed.
GUNSBERG, MORRIS, *Sociology*, 1934.
GYE, W. S., 'Aetiology of Malignant Growths,' *Lancet*, 18th July 1925.

- HADFIELD, S., and GARROD, J. P., *Recent Advances in Pathology*, 1932.
- HAECKEL, ERNST, *Evolution of Man*, 1905.
- HALDANE and HUXLEY, *Animal Biology*, 1927.
- HALLAM, HENRY, *Constitutional History of England*.
—, *Europe during the Middle Ages*.
- HANDLEY, W. SAMPSON, *Melanotic Sarcoma*, Hunt. Lect., 1907.
- , 'Paget's Disease,' *Brit. Jl. Surg.*, vii, No. 26.
- , *Cancer of the Breast*, 1922.
- , *Genesis of Cancer*, 1931.
- HARVEY, WILLIAM, *The Motion of the Heart and Blood*.
- HAWKINS, H. L., 'Palacontology and Humanity,' *Brit. Assoc., Geology*, 1936.
- HERNAMAN-JOHNSON, F., 'Radio-Therapeutics of Cancer,' *Lancet*, 27th September 1924.
- HERTZOG, O., *Evolution and Epigenesis*.
- HIPPOCRATES, *Works*, translated Adams, 1849.
- HOBBS, THOMAS, *The Leviathan*.
- HUDSON, W. H., *The Naturalist in La Plata*.
- HUNTER, JOHN, *Works*, ed. Palmer, 1837.
- HUTCHINSON, JONATHAN, *The Pedigree of Disease*.
- HUXLEY, JULIAN S., *The Individual in the Animal Kingdom*.
—, *Essays of a Biologist*.
—, 'Studies in De-differentiation,' *Jour. Micro. Soc.*, 65.
—, 'Constant and Differential Growth Ratios,' *Nature*, 20th December 1924.
— and DE BEER, *Elements of Experimental Embryology*, 1934.
- JAMES, WILLIAM, *Principles of Psychology*.
- KEEBLE, SIR F., *Plant Animals*, 1910.
- KEITH, SIR ARTHUR, *Human Embryology*, 1921.
—, *Antiquity of Man*, 1925.
—, 'Does Man's Body represent a Commonwealth?' *R.P.G. Annual*.
—, *Place of Prejudice in Modern Civilization*.
—, *Ethnos*, 1931.
—, *Menders of the Maimed*, 1919.
—, *Differentiation of Mankind into Racial Types*.

- KEITH, SIR ARTHUR, *Engines of the Human Body*.
- KETTLE, E. H., 'Polymorphoses of Malignant Cells,' *Proc. R.S.M.*,
15th April 1921.
- KNOX, ROBERT, *Radiology*, 1918.
- LACAZE-DUTHIERS, 'Galls,' *Ency. Brit.*, 11th ed.
- LAMARCK, J. H., *Philosophie zoologique*.
—, *Histoire naturelle des animaux sans vertèbres*.
- LANGDON-BROWN, SIR W., *Biology of the Endocrine System*, 1922.
—, *Integration of the Endocrine System*, 1935.
—, *Biology of Social Life*, Maudsley Lecture, 1936.
- LANKESTER, SIR E. RAY, 'Protozoa,' *Ency. Brit.*
—, 'Mollusca,' *Ency. Brit.*
- LATHAM, DR P. M., *Works*, New Sydenham Soc., 1877.
- LEITCH, A., 'Cessation of Irritant in Exper. Tar Cancer,' *Brit. Med. Jour.*, 7th July 1923.
- LE BON, GUSTAVE, *Psychologie des foules*.
- LERICHE et POLICARDE, *Problèmes de la physiologie de l'os*.
- LETHABY, W. R., *Architecture*.
- LEVY and Others, *Aspects of Dialectical Materialism*.
- LOEB, J., *The Organism as a Whole*, 1916.
- LUCIANA, L., *Human Physiology*, 1911.
- MACALISTER, A., 'Anatomy,' *Ency. Brit.*
- MCBRIDE, E. W., 'Are Acquired Characteristics inherited?' *Trans. S.P. Union Soc.*
- MACDONALD, J. R., *Socialism*, 1907.
- MCDUGALL, J. R., *Physiological Psychology*.
- MAINE, SIR H. S., *Ancient Law*, 1905.
—, *Village Communities*.
—, *Early History of Institutions*.
- MARX, KARL, *Capital*.
- MERCIER, CHARLES, *Textbook of Insanity*.
- MILL, J. S., *System of Logic*.
—, *Political Economy*.
- MITCHELL, SIR P. CHALMERS, *Evolution and the War*.
- MINCHIN, E. A., 'Protozoa,' *Ency. Brit.*
—, 'Hydromedusae,' *Ency. Brit.*
—, 'Protoplasm,' *Ency. Brit.*

- MOORE, BENJAMIN, *Origin and Nature of Life*.
— and WHITLEY, 'On Immunity,' *Bioch. Jour.*, vol. iv, 1907.
MUIRHEAD, JAMES, 'Roman Law,' *Ency. Brit.*, 11th ed.
- NEEDHAM, J., *Science, Religion, and Reality*, 1926.
NICHOLSON, G. W., *The Nature of Tumour Formation*, 1926.
—, 'Studies on Tumour Formation,' *Guy's Hosp. Reports*, 1922-37.
NUTTALL, G. H. F., *Symbiosis in Plants and Animals*, Brit. Assoc. Lect., 1923.
- PAVLOV, IVAN P., *Conditioned Reflexes*.
PAYNE, J. T., *Thomas Sydenham*, Masters of Med. Series.
PEARSON, KARL, *Grammar of Science*.
- ROBERTS, MORLEY, 'Malignancy,' *Arch. Radiol.*, 1920.
—, 'Necessary Organs,' *Brit. Med. Jour.*, 22nd January 1921.
—, *Warfare in the Human Body*, 1920.
—, *Malignancy and Evolution*, 1926.
—, *The Serpent's Fang*, essays in biology, 1930.
—, 'Immune Reactions,' *Brit. Med. Jour.*, 8th December 1917.
- ROSEBERY, LORD, *Pitt*.
RUMNEY, J., *Herbert Spencer's Sociology*.
RUSSELL, E. S., *Form and Function*, 1916.
- SCHÄFER, E. A., *Endocrine Organs*, 1916.
—, *Essentials of Histology*.
SHERRINGTON, C. S., 'Physiology of Muscle and Nerve,' *Ency. Brit.*
SODDY, FREDERICK, *Matter and Energy*.
SOHM, *Roman Law*.
SPENCER, HERBERT, *Works*, collected.
SPINOZA, *Tractatus Politicus*.
STARLING, E. H., *Physiology*.
—, *Law of the Heart*, 1916.
—, *Chemical Correlations of Functions of the Body*, 1905.
STODDART, W. H. B., *The New Psychiatry*, 1915.
SUTTON, H. GAWEN, *Lectures on Pathology*.
- TOUSSENEL, ALPHONSE, *L'Esprit des bêtes*, 1847, v. Larousse.
TROTTER, WILFRED, 'Physiology of Pain,' *Med. Soc. Abstracts*, 1921,
—, *Herd Instincts in Peace and War*.

VERNON, H. M., *Variation in Animals and Plants*, 1903.

WALLACE, A. R., *Darwinism*, 1869.

WATSON, D. M., 'Adaptations,' *Nature*, 10th August 1929.

WATSON, SIR THOMAS, *Lectures on Principles and Practice of Physic*, 1871.

WEISMANN, A., *The Germ Plasm*, London, 1893.

WILSON, J. F., *The Cell*.

WOLFF, JULIUS, *Law of Bone Transformation*, Acad. Sc., Berlin, 1892.

WOODLAND, W., 'Descent of the Testicles,' *Proc. Zool. Soc.*, i, 1903.

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